15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

Submittal Package for

Robert A. Young Building—Solar PV Project

Submitted by:

Kirk Bedell, project manager

Kirk@brightergy.com

c. 314.323.3380

Client approval:

Approved by: _____

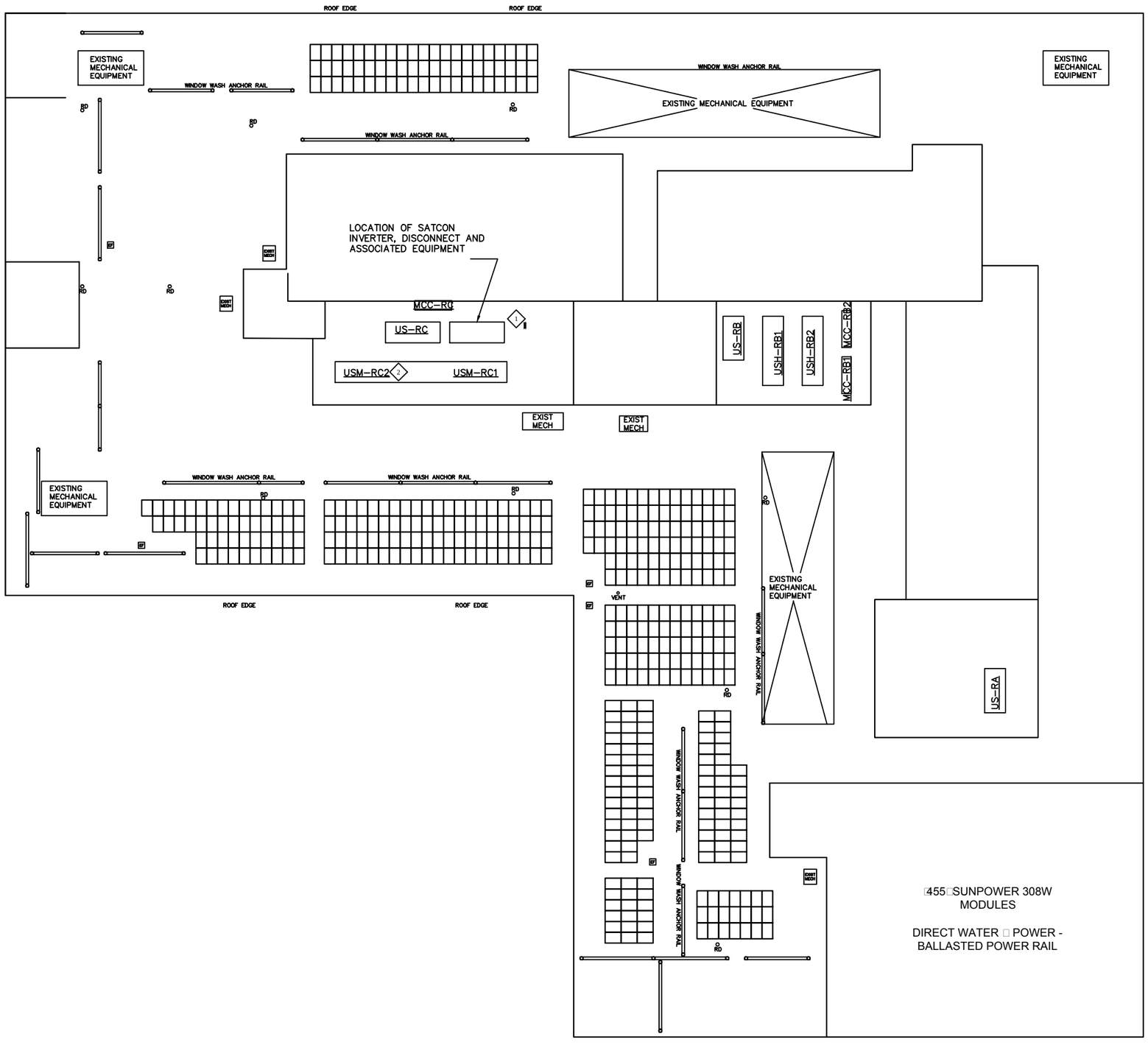
Date: _____

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

Table of Contents

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(A.) PV system design specs & Electrical one line diagram



Brightergy
SOLAR SOLUTIONS

15209 W. 99TH ST.
LENEXA, KS 66219
PH. 913 735-9733

PROJECT INFORMATION:

Robert A. Young Federal Bldg

140.14 P S

1222 S S,
S L, MO 63103

ISSUE DATE:

05/20/11

REV.:	DATE:	DESCRIPTION:	BY:

CLIENT:

DRAWN BY:	CHK.:	APV.:
AN	AN	AN

STAMP:

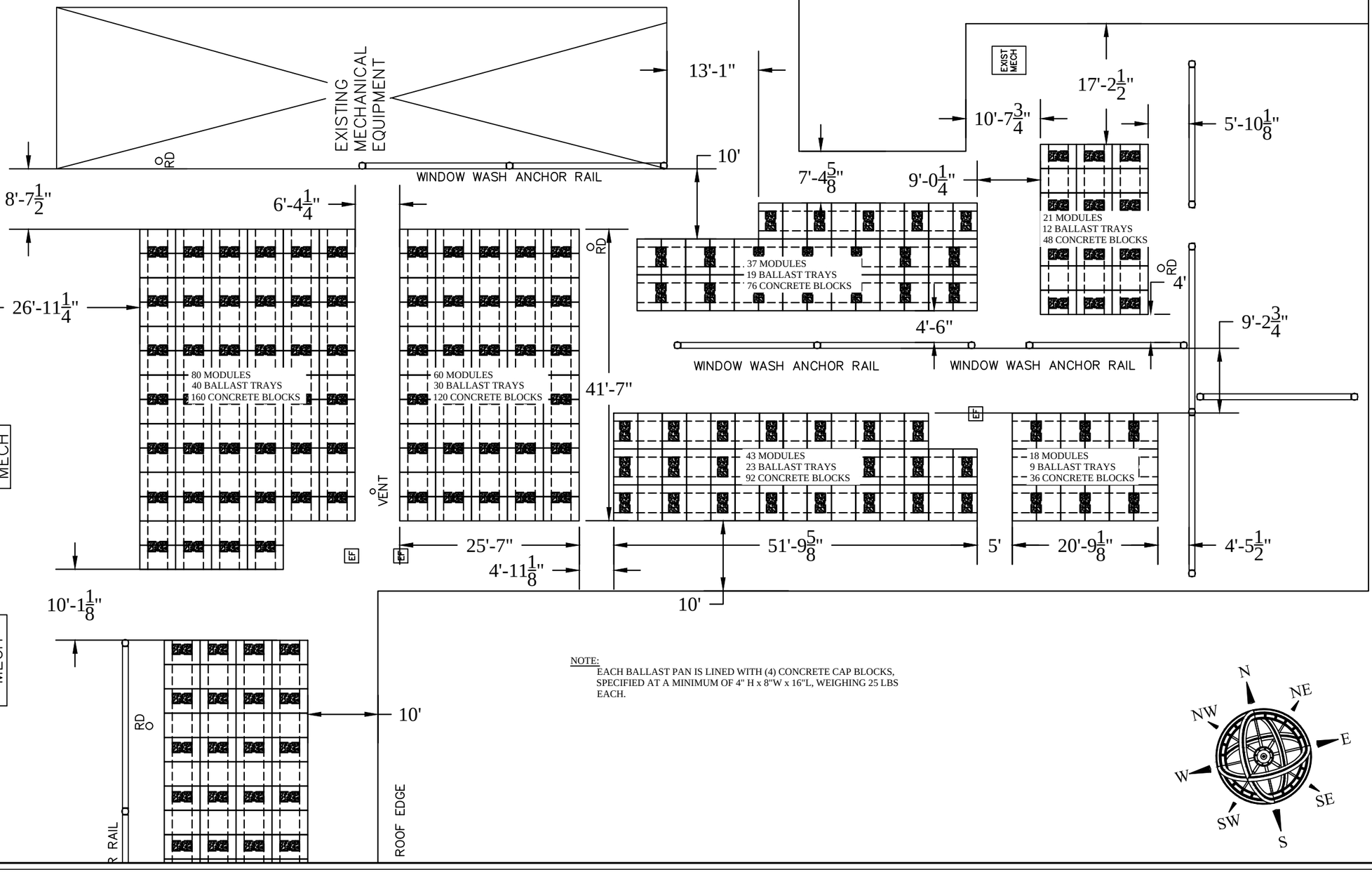
SHEET TITLE:

SITE PLAN

SHEET NUMBER:

SHEET NUMBER
A1

NOTE:
PLANS ARE NOT TO SCALE. DIMENSIONS ARE TRUE.
RAIL & BALLAST TO BE INSTALLED PER MANUF. SPECS.



NOTE:
EACH BALLAST PAN IS LINED WITH (4) CONCRETE CAP BLOCKS, SPECIFIED AT A MINIMUM OF 4" H x 8"W x 16"L, WEIGHING 25 LBS EACH.

Brightergy
SOLAR SOLUTIONS
15209 W. 99TH ST.
LENEXA, KS 66219
PH. 913.735-9733

PROJECT INFORMATION:

Robert A. Young Federal Bldg

140.14 P S

1222 S S,
S L, MO 63103

ISSUE DATE:
05/20/11

REV.:	DATE:	DESCRIPTION:	BY:

CLIENT:

DRAWN BY:	CHK.:	APV.:
AN	AN	AN

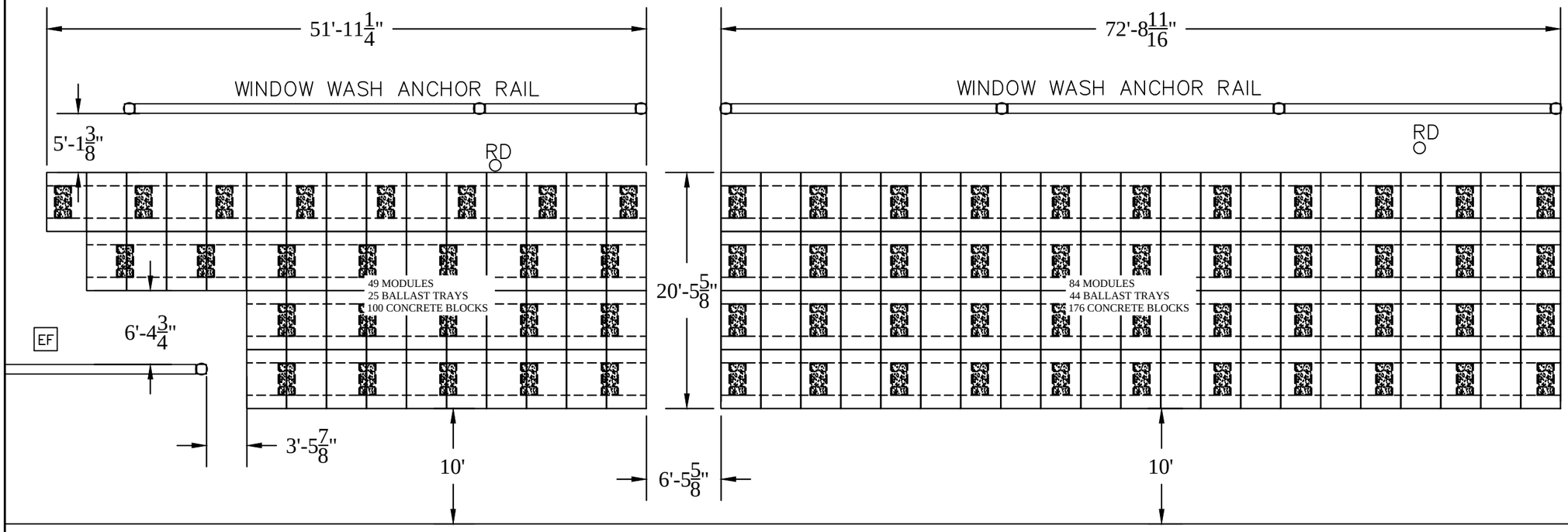
STAMP:

SHEET TITLE:
EAST ARRAY LAYOUT

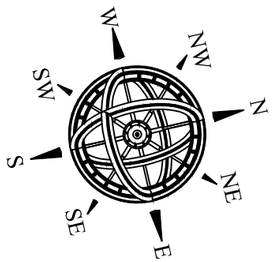
SHEET NUMBER:
SHEET NUMBER
A2

NOTE:
PLANS ARE NOT TO SCALE. DIMENSIONS ARE TRUE.
RAIL & BALLAST TO BE INSTALLED PER MANUF. SPECS.

EXIST
MECH



NOTE:
EACH BALLAST PAN IS LINED WITH (4) CONCRETE CAP BLOCKS, SPECIFIED AT A MINIMUM OF 4" H x 8"W x 16"L, WEIGHING 25 LBS EACH.



Brightergy
SOLAR SOLUTIONS
15209 W. 99TH ST.
LENEXA, KS 66219
PH. 913 735-9733

PROJECT INFORMATION:

Robert A. Young Federal Bldg
140.14 P S
1222 S S,
S L, MO 63103

ISSUE DATE:
05/20/11

REV.:	DATE:	DESCRIPTION:	BY:

CLIENT:

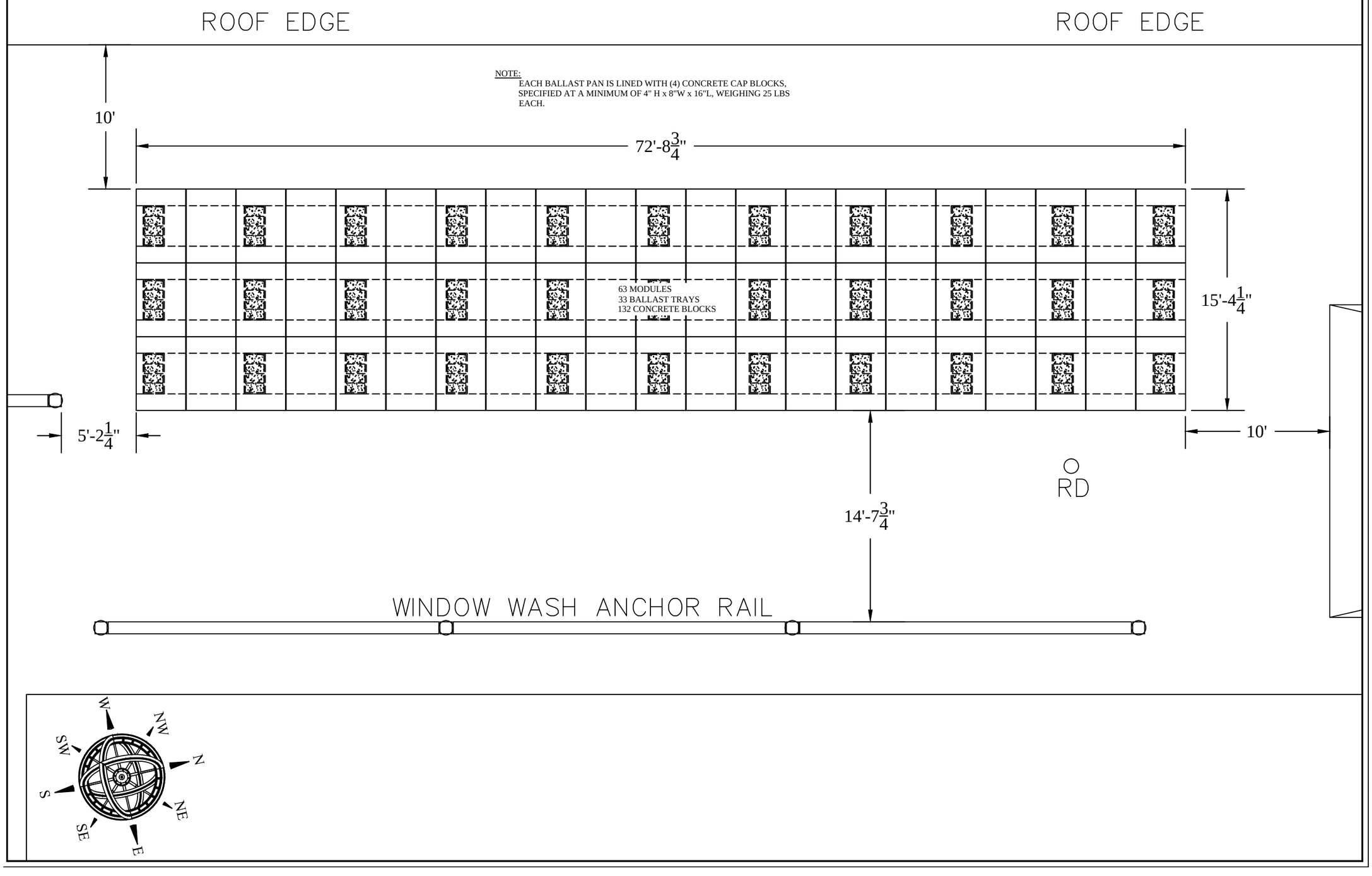
DRAWN BY:	CHK.:	APV.:
AN	AN	AN

STAMP:

SHEET TITLE:
CENTRAL ARRAY LAYOUT

SHEET NUMBER:
SHEET NUMBER
A3

NOTE:
PLANS ARE NOT TO SCALE. DIMENSIONS ARE TRUE.
RAIL & BALLAST TO BE INSTALLED PER MANUF. SPECS.



Brightergy
SOLAR SOLUTIONS
15209 W. 99TH ST.
LENEXA, KS 66219
PH. 913 735-9733

PROJECT INFORMATION:

Robert A. Young Federal Bldg
140.14 P S
1222 S S,
S L, MO 63103

ISSUE DATE:
05/20/11

REV.:	DATE:	DESCRIPTION:	BY:

CLIENT:

DRAWN BY:	CHK.:	APV.:
AN	AN	AN

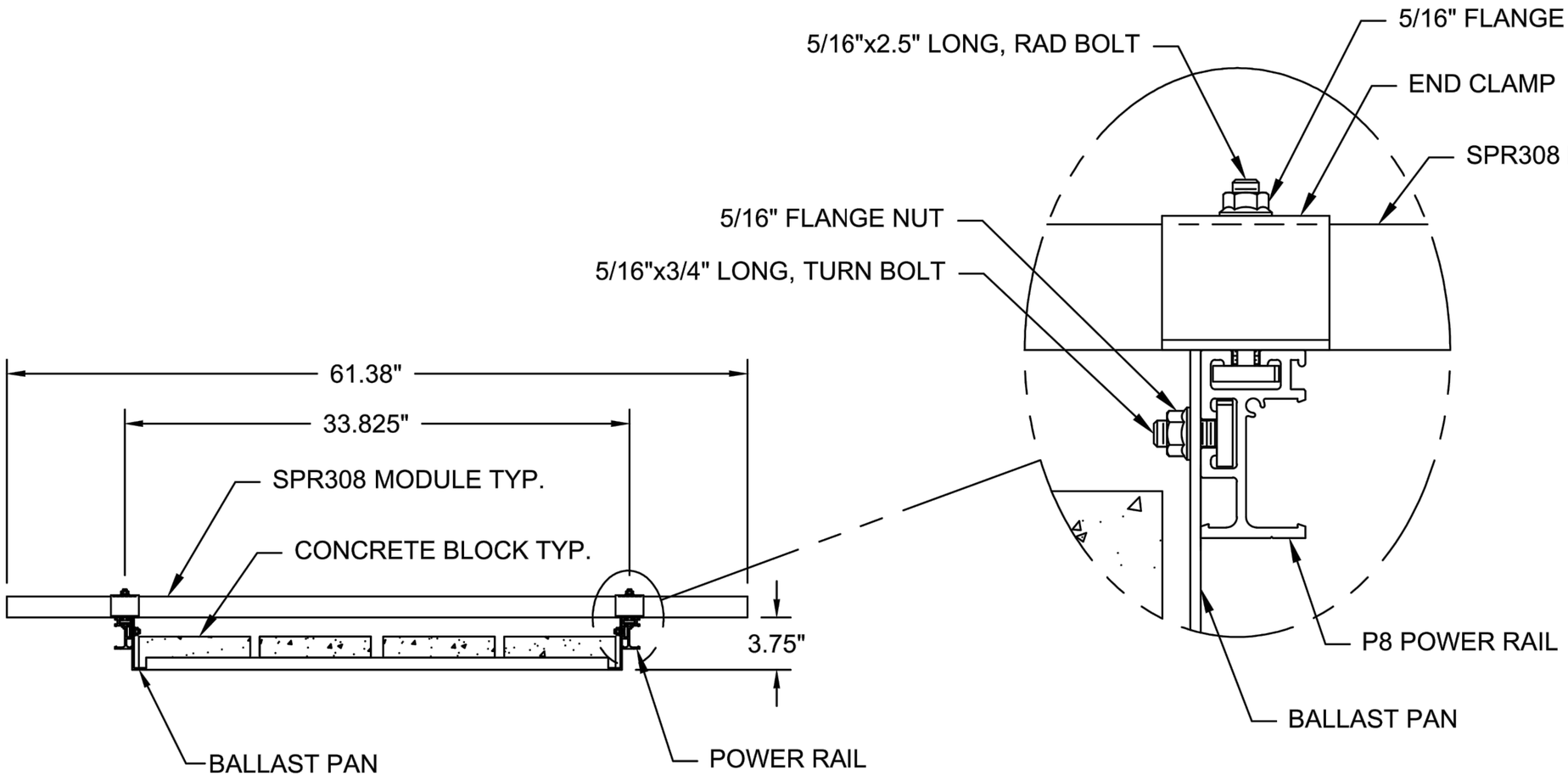
STAMP:

SHEET TITLE:
WEST ARRAY LAYOUT

SHEET NUMBER:
SHEET NUMBER
A4

NOTE:

ALL HARDWARE IS STAINLESS STEEL.



SIDE VIEW

(PARTIAL, NOT TO SCALE)

Brightergy
SOLAR SOLUTIONS
15209 W. 99TH ST.
LENEXA, KS 66219
PH. (913) 735-9733

PROJECT INFORMATION:

Robert A. Young Federal Bldg

140.14 P S

1222 S S.,
S L, MO 63103

ISSUE DATE:

05/20/11

REV.:	DATE:	DESCRIPTION:	BY:

CLIENT:

DRAWN BY: | CHK.: | APV.:

AN	AN	AN

STAMP:

SHEET TITLE:

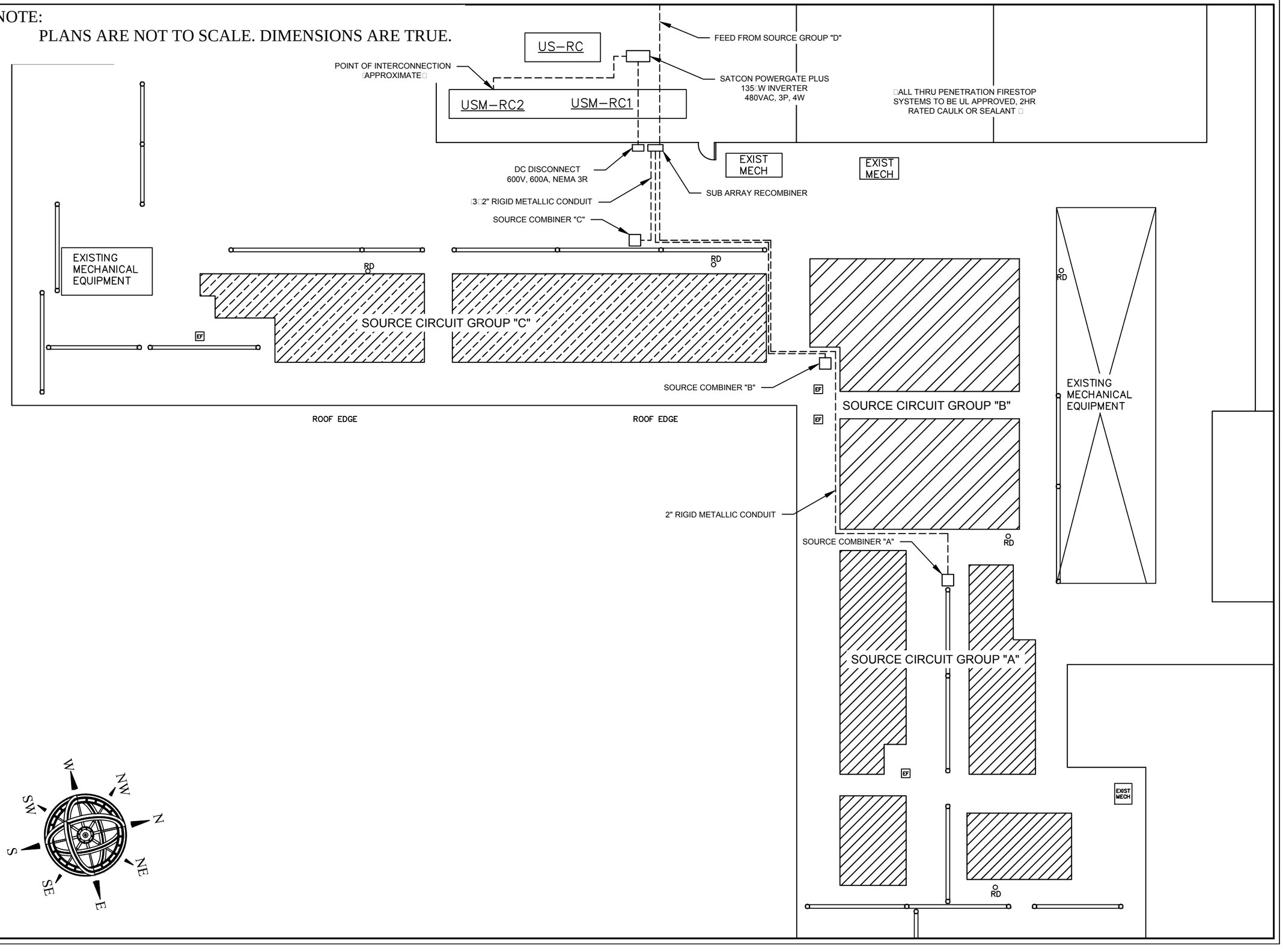
CONNECTION DETAIL

SHEET NUMBER:

SHEET NUMBER

S1

NOTE:
PLANS ARE NOT TO SCALE. DIMENSIONS ARE TRUE.



Brightergy
SOLAR SOLUTIONS
15209 W. 99TH ST.
LENEXA, KS 66219
PH. □913□735-9733

PROJECT INFORMATION:

Robert A. Young Federal Bldg
140.14□□ P□□□□□□□□□S□□□□
1222 S□□□□□ S□,
S□L□□□, MO 63103

ISSUE DATE:
05/20/11

REV.:	DATE:	DESCRIPTION:	BY:

CLIENT:

DRAWN BY:	CHK.:	APV.:
AN	AN	AN

STAMP:

SHEET TITLE:
EAST ARRAY LAYOUT

SHEET NUMBER:
SHEET NUMBER
E1

NOTE:
PLANS ARE NOT TO SCALE. DIMENSIONS ARE TRUE.

ROOF EDGE

ROOF EDGE

IG
NICAL
IENT

SOURCE CIRCUIT GROUP "D"

WINDOW WASH ANCHOR R

EXISTING MECHANICAL EQUIP

SOURCE COMBINER "D"

RD

RD

RD

1.5" RIGID METALLIC CONDUIT

ALL THRU PENETRATION FIRESTOP SYSTEMS TO BE UL APPROVED, 2HR RATED CAULK OR SEALANT

EXIST MECH

EXIST MECH

US–RC

SATCON POWERGATE PLUS
135 W INVERTER
480VAC, 3P, 4W

POINT OF INTERCONNECTION
APPROXIMATE

USM–RC2

USM–RC1

DC DISCONNECT
600V, 600A, NEMA 3R

FEED FROM SOURCE GROUPS "ABC"

SUB ARRAY RECOMBINER

EXIST MECH

EXIST MECH

W NW N NE E SE S SW

Brightergy
SOLAR SOLUTIONS
15209 W. 99TH ST.
LENEXA, KS 66219
PH. 913 735-9733

PROJECT INFORMATION:

Robert A. Young Federal Bldg

140.14 P S

1222 S S ,
S L , MO 63103

ISSUE DATE:

05/20/11

REV.:	DATE:	DESCRIPTION:	BY:

CLIENT:

DRAWN BY:	CHK.:	APV.:
AN	AN	AN

STAMP:

SHEET TITLE:

WEST ARRAY LAYOUT

SHEET NUMBER:

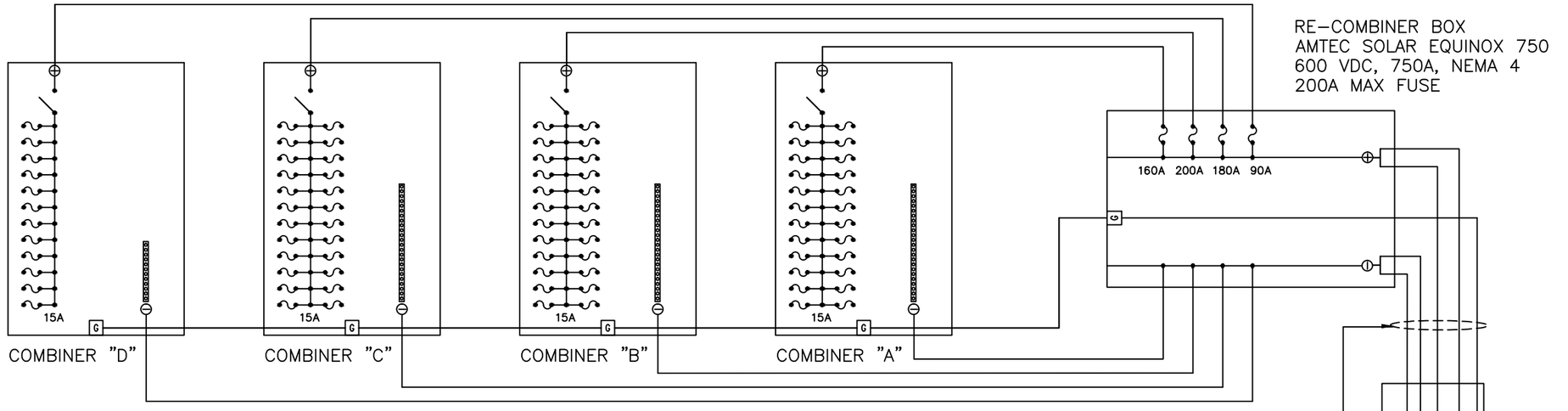
SHEET NUMBER
E2

COMBINER "D"–63 TOTAL MODULES
7 SERIES X 9 PARALLEL STRINGS
SPR–308 (E19) 308w
562.625 Voc, 6.02 Isc
382.9 Vmp, 5.64 Imp
OUTPUT:
6.02A x 1.25 x 1.25 x 9 = 84.65A
DISTANCE TO RECOMBINER: 150'

COMBINER "C"–133 TOTAL MODULES
7 SERIES X 19 PARALLEL STRINGS
SPR–308 (E19) 308w
562.625 Voc, 6.02 Isc
382.9 Vmp, 5.64 Imp
OUTPUT:
6.02A x 1.25 x 1.25 x 19 = 178.4A
DISTANCE TO RECOMBINER: 25'

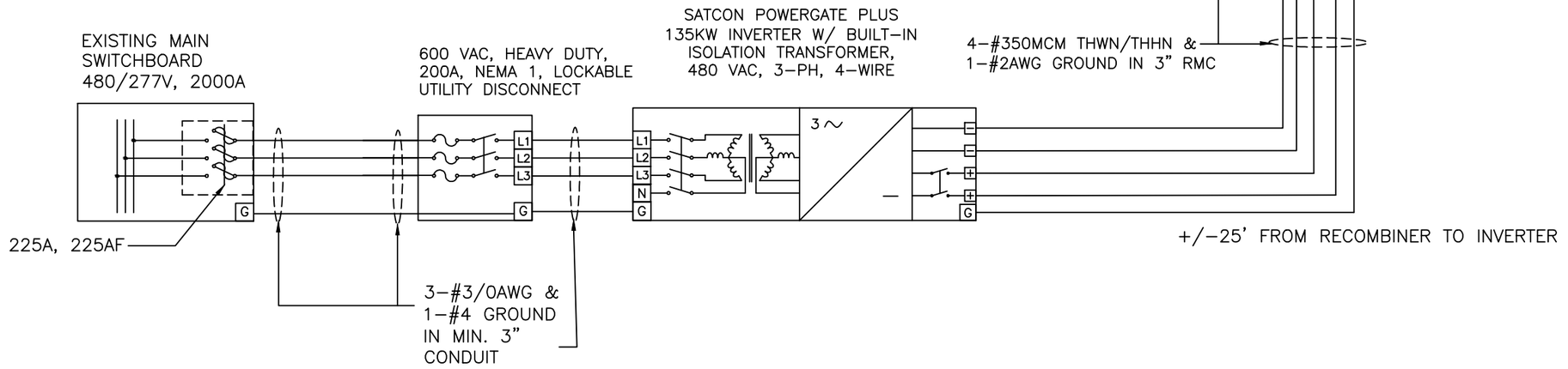
COMBINER "B"–140 TOTAL MODULES
7 SERIES X 20 PARALLEL STRINGS
SPR–308 (E19) 308w
562.625 Voc, 6.02 Isc
382.9 Vmp, 5.64 Imp
OUTPUT:
6.02A x 1.25 x 1.25 x 20 = 187.8A
DISTANCE TO RECOMBINER: 75'

COMBINER "A"–119 TOTAL MODULES
7 SERIES X 17 PARALLEL STRINGS
SPR–308 (E19) 308w
562.625 Voc, 6.02 Isc
382.9 Vmp, 5.64 Imp
OUTPUT:
6.02A x 1.25 x 1.25 x 17 = 159.65A
DISTANCE TO RECOMBINER: 150'



COMBINER/DISCONNECT (1 TOTAL)
AMTEC SOLAR #PROM12–100–600V
600VDC, 100A, NEMA 4X, 15A FUSE

COMBINER/DISCONNECT (3 TOTAL)
AMTEC SOLAR #PROM24–200–600V
600VDC, 200A, NEMA 4X, 15A FUSE



Brightergy
SOLAR SOLUTIONS
15209 W. 99TH ST.
LENEXA, KS 66219
PH. (913) 735-9733

PROJECT INFORMATION:

Robert A. Young
Federal Bldg
140.14□□ P□□□□□□□□□S□□□□
1222 S□□□□□ S□,
S□L□□□, MO 63103

ISSUE DATE:
05/20/11

REV.:	DATE:	DESCRIPTION:	BY:

CLIENT:

DRAWN BY:	CHK.:	APV.:
AN	AN	AN

STAMP:

SHEET TITLE:
ELECTRIC
LINE DWG

SHEET NUMBER:
SHEET NUMBER
E3

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(B.)Engineering Calculations and Seismic Detail Report

DPW | SOLAR
PREFORMED LINE PRODUCTS

DATE: 5/17/2011
CUSTOMER: BRIGHTERGY
PROJECT: ROBERT A. YOUNG

SYSTEM: A Power RAIL BPRM for 12 SUNPOWER 308, 0-degree tilt. The design wind speed is 90mph, exposure C, with a building height of 120'.

CALCULATE UPLIFT:
Based on wind tunnel testing the uplift forces for the full array with a wind directly from the north can be calculated as follows:

North Row:	12 modules	X	61.6 lbs/module =	739.2 lbs
			TOTAL UPLIFT FORCE:	739.2 lbs

CALCULATE BALLAST:

Component	Quantity	Weight	Total weight
SUNPOWER 308	12	41 lbs	492 lbs
Ballast Blocks*	24	25 lbs	600 lbs
Racking Components			160.3 lbs
		TOTAL SYSTEM WEIGHT:	1252.3 lbs

The ballast weight exceeds the uplift force: Stability Check (Ballast/Uplift): 1.69
The weight of the modules, the ballast blocks, and all racking components is 5.5psf when averaged over the area the system covers.

The control room at the Langley Full-Scale Tunnel:

**The ballast blocks are 4"x8"x16" solid concrete "Cap Blocks" which weigh 25 pounds and have actual dimensions of 3.63"x7.63"x15.63".*

DPW | SOLAR
PREFORMED LINE PRODUCTS

DATE: 5/17/2011
CUSTOMER: BRIGHTERGY
PROJECT: ROBERT A. YOUNG

SYSTEM: A Power RAIL BPRM for 9 SUNPOWER 308, 0-degree tilt. The design wind speed is 90mph, exposure C, with a building height of 120'.

CALCULATE UPLIFT:
Based on wind tunnel testing the uplift forces for the full array with a wind directly from the north can be calculated as follows:

North Row:	9 modules	X	61.6 lbs/module =	554.4 lbs
			TOTAL UPLIFT FORCE:	554.4 lbs

CALCULATE BALLAST:

Component	Quantity	Weight	Total weight
SUNPOWER 308	9	41 lbs	369 lbs
Ballast Blocks*	20	25 lbs	500 lbs
Racking Components			120.2 lbs
		TOTAL SYSTEM WEIGHT:	989.2 lbs

The ballast weight exceeds the uplift force: Stability Check (Ballast/Uplift): 1.78
The weight of the modules, the ballast blocks, and all racking components is 5.8psf when averaged over the area the system covers.

The control room at the Langley Full-Scale Tunnel:

**The ballast blocks are 4"x8"x16" solid concrete "Cap Blocks" which weigh 25 pounds and have actual dimensions of 3.63"x7.63"x15.63".*

LORAC DESIGN GROUP, LLC
Structural Engineers

May 17, 2011

Mr. Alex Norman, Solar Design Specialist
Brightergy
15209 West 99th Street
Lenexa, Kansas 66219

Re: Roof Review for Solar Panel Installation
Robert A. Young – St. Louis, Missouri

Dear Alex,

At your request I have performed a structural review of the above referenced building and have determined that the roof structure can safely accept the additional loading. This analysis is based on provided drawings, equipment weights, and engineering calculations. Also included in the analysis were provided solar panel information, frame and ballast weights and configuration information supplied by your office.

Our analysis has placed this configuration at approximately 6.5 psf, which is believed to be within the normal miscellaneous dead load of this building, and with a code derived Live Load capacity of 20 psf. Therefore we are comfortable with both the proposed load path and building's capacity in supporting this load on the original roof structural system.

Should you have any additional comments or questions please contact me directly. Thank you for this opportunity to assist you with this project.

Sincerely,

LORAC Design Group, LLC
Structural Engineers

Joseph A. Towns, PE, NCARB, LEED AP, BD+C
Managing Principal
Missouri License #E-22017
Missouri Certificate of Authority, E-2005032846-D

cc: Jordon Ringel, CFO

Offices: 809 NE Panther Valley Lee's Summit Missouri 64064 office 816-529-4019 fax 816-478-1360

SEISMIC LOADS - ASCE 7-2005

Site Class Soil Definition	D		Per Geotechnical recommendation
.2 Second Response S_s=	0.460		Map Figure 22-1 p.211
F_a =	1.60		Table 11.4-1
S_{MS} = F_a x S_s =	0.74		Eq. 11.4-1
S_{DS} = 2/3 S_{MS} =	0.49		Eq. 11.4-3
1 Second Response S_1=	0.12		Map Figure 22-2 p.213
F_v =	2.40		Table 11.4-2
S_{M1} = F_v x S_1 =	0.29		Eq. 11.4-2
S_{D1} = 2/3 S_{M1} =	0.192		Eq. 11.4-4
Occupancy	III		Table 1-1 (p3)
Seismic Design Category	C		Table 11.4-1 (p115)
	C		Table 11.4-2 (p115)
Importance Factor I =	1.3		Table 11.5-1, Category I (p116)
Redundancy ρ=	1.0		12.3.4.1 (Design Category B or C) (p126)

Ordinary Steel Concentrically Braced Frame

Overstrength factor Ω_o =	3.0		Table 12.2-1 Steel Systems Not Specific
Response Modification Coeff R=	3.0		Table 12.2-1 Steel Systems Not Specific

Base Shear for Building $V = C_s W$ — Eq. 12.8-1 (p129)

$C_s = \frac{S_{DS}}{R / I}$ = 0.213 Use — Eq. 12.8-2

Max. $C_s = \frac{S_{D1}}{(R / I) T}$ = 0.44 — Eq. 12.8-3

$T_a = C_T h_n^x$ =	0.19		Eq. 12.8-7
C_T =	0.020		Table 12.8-2 -All other systems
h_n=	20		Taken at Median height
x=	0.75		Table 12.8-2-All other systems
T<= $C_u T_a$=	0.30		OK
C_u=	1.6		Table 12.8-1 (p129) for S_{D1}<.1

(See Eq. 12.8-4 for period T> $T_{L\ of}$ 12 sec for Max Cs)

Min. $C_s = \frac{.5\ S_1}{R / I}$ = 0.026 <= .01 — Eq. 12.8-5 and 12.8-6

STATE OF MISSOURI
JOSEPH ALAN TOWNS
NUMBER E-22017
REGISTERED PROFESSIONAL ENGINEER

Dead Load Roof=	Previously Considered	0.00 k
Dead Load Solar Array=	Area of Array x 5 psf Max Load	9.77 k
		k
		9.77 k

Total Dead Load W for Bldg= 9.77 k

Total Base Shear $V = C_s W$ = 2.1 k — 174 lbs per Standoff, OK (56 Loc.)

ESTIMATED

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(C.)Interconnection Agreement

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

Kirk Bedell and Denise Ryerkerk will work out this paperwork with Ameren—since the RAY PV system is over 100 kW, it is not considered a “Qualified Net Metering Unit” but rather a “Qualifying Facility.”

We need to ensure we fill out the proper forms for Interconnection and go through the proper channels within Ameren.

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(D.)PV Module Specs

SUNPOWER

E18 / 308 SOLAR PANEL

EXCEPTIONAL EFFICIENCY AND PERFORMANCE

BENEFITS

Highest Efficiency
SunPower™ Solar Panels are the most efficient photovoltaic panels on the market today.

More Power
Our panels produce more power in the same amount of space—up to 50% more than conventional designs and 100% more than thin film solar panels.

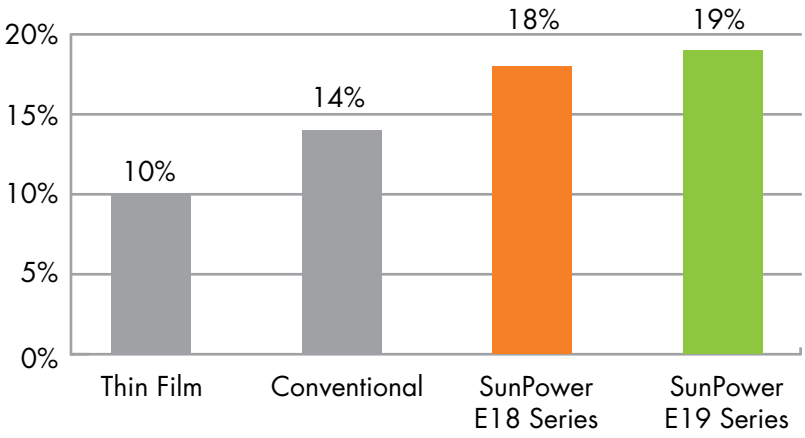
Reduced Installation Cost
More power per panel means fewer panels per install. This saves both time and money.

Reliable and Robust Design
Proven materials, tempered front glass, and a sturdy anodized frame allow panel to operate reliably in multiple mounting configurations.

E18 SERIES

The SunPower™ 308 Solar Panel provides today's highest effciency and performance. Utilizing 96 back-contact solar cells, the SunPower 308 delivers a total panel conversion effciency of 18.7%. The panel's reduced voltage-temperature coefficient and exceptional low-light performance attributes provide outstanding energy delivery per peak power watt.

SunPower's High Efficiency Advantage



SPR-308E-WHT-D

c UL us

SUNPOWER™

E18 / 308 SOLAR PANEL

EXCEPTIONAL EFFICIENCY AND PERFORMANCE

Electrical Data

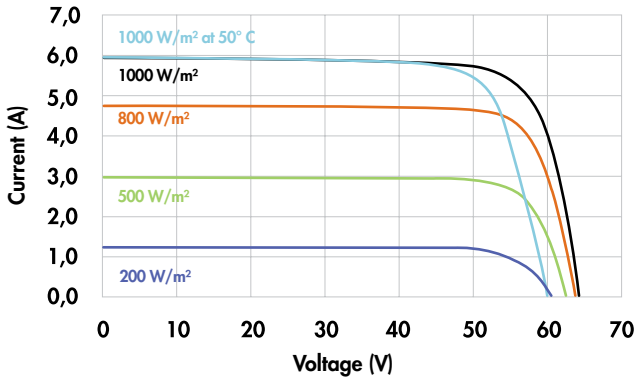
Measured at Standard Test Conditions (STC): irradiance of 1000W/m², AM 1.5, and cell temperature 25° C

Peak Power (+5/-3%)	P_{max}	308 W
Efficiency	η	18,7 %
Rated Voltage	V_{mpp}	54.7 V
Rated Current	I_{mpp}	5.64 A
Open Circuit Voltage	V_{oc}	64.3 V
Short Circuit Current	I_{sc}	6.02 A
Maximum System Voltage	UL	600 V
Temperature Coefficients	Power (P)	-0.38% / K
	Voltage (V_{oc})	-176.6mV / K
	Current (I_{sc})	3.5mA / K
NOCT		45° C +/-2° C
Series Fuse Rating		15 A

Mechanical Data

Solar Cells	96 SunPower all-back contact monocrystalline
Front Glass	high transmission tempered glass
Junction Box	IP-65 rated with 3 bypass diodes
	Dimensions: 32 x 155 x 128 (mm)
Output Cables	1000mm length cables / MultiContact (MC4) connectors
Frame	Anodized aluminum alloy type 6063 (black)
Weight	41 lbs. (18.6 kg)

I-V Curve



Current/voltage characteristics with dependence on irradiance and module temperature.

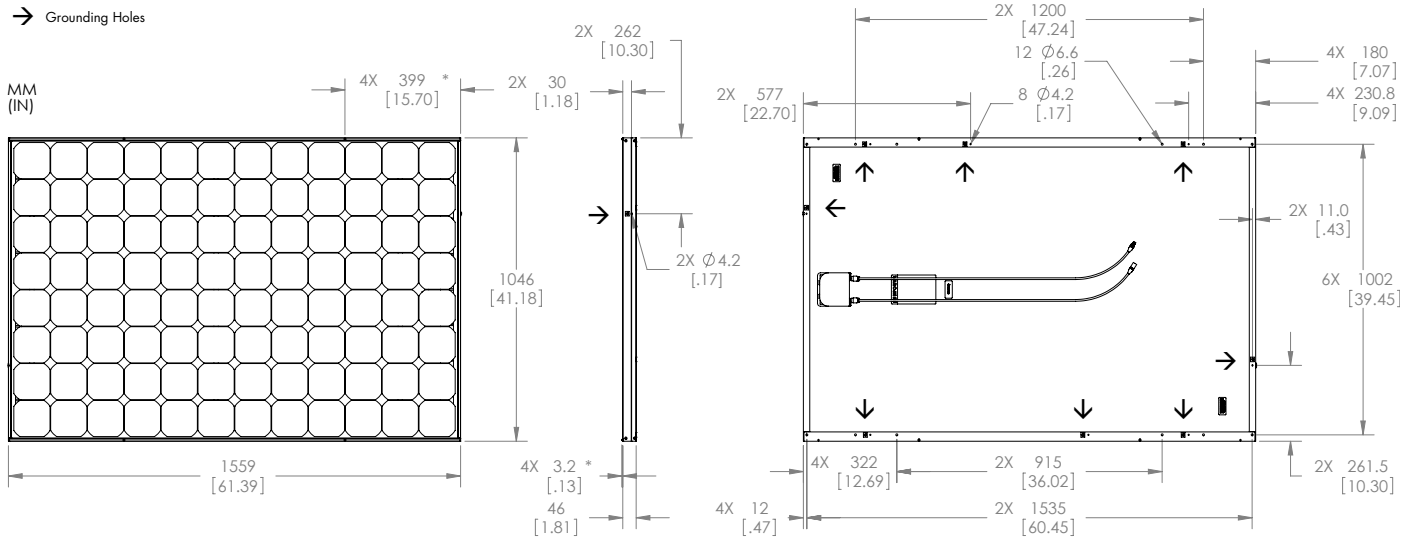
Tested Operating Conditions

Temperature	-40° F to +185° F (-40° C to + 85° C)
Max load	113psf 550 kg/m² (5400 Pa), front (e.g. snow) w/specified mounting configurations
	50 psf 245 kg/m² (2400 Pa) front and back – e.g. wind
Impact Resistance	Hail 1 in (25 mm) at 52mph (23 m/s)

Warranties and Certifications

Warranties	25 year limited power warranty
	10 year limited product warranty
Certifications	Tested to UL 1703. Class C Fire Rating

Dimensions



CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

Visit sunpowercorp.com for details

Document #001-60702 Rev** / LTR_EN

TINGEN TECHNOLOGY GROUP CO.,LTD
www.tingensolar.com
Contact: Jerry Sheng (CEO)
E-mail: tingengroup@yeah.net
E-mail: china@tingensolar.com
Mobilephone: +135 3093 3539
Tel / Fax: +86 755 2809 5017
MSN:jerry-sheng@hotmail.com

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(E.)Inverter specs

PVS-135 (208 V)
PVS-135 (240 V)
PVS-135 (480 V)

Unparalleled Performance

With their advanced system intelligence, next-generation Edge™ MPPT technology, and industrial-grade engineering, PowerGate® Plus inverters maximize system uptime and power production, even in cloudy conditions.

Power Efficiency

Power Level	Output Power[1]	Efficiency[2]
10%	13.5 kW	92.9%
20%	27 kW	95.8%
30%	40.5 kW	96.5%
50%	67.5 kW	96.7%
75%	101.25 kW	96.5%
100%	135 kW	96.2%

[1] 310V minimum [2] 480V model

Edge MPPT

Provides rapid and accurate control that boosts PV plant kilowatt yield

Provides a wide range of operation across all photovoltaic cell technologies

Printed Circuit Board Durability

Wide thermal operating range: -40° C (-40° F) to 85° C (185° F)

Conformal coated to withstand extreme humidity and air-pollution levels

Proven Reliability

Rugged and reliable, PowerGate Plus PV inverters are engineered from the ground up to meet the demands of large-scale installations.

Low Maintenance

Modular components make service efficient

Safety

UBC Seismic Zone 4 compliant

Built-in DC and AC disconnect switches

Integrated DC two-pole disconnect switch isolates the inverter (with the exception of the GFDI circuit) from the photovoltaic power system to allow inspection and maintenance

Built-in isolation transformer

Protective covers over exposed power connections

PV Inverters | PowerGate Plus 135 kW

PowerGate Plus 135 kW Specifications			UL/CSA
Input Parameters			
Maximum Array Input Voltage	600 VDC		•
Input Voltage Range (MPPT; Full Power)	310–600 VDC	208 VAC	•
	320–600 VDC	240 VAC	•
	310–600 VDC	480 VAC	•
Maximum Input Current	454A DC	208 VAC	•
	440A DC	240 VAC	•
	454A DC	480 VAC	•
Output Parameters			
Output Voltage Range (L-L)	183–229 VAC	208 VAC	•
	211–264 VAC	240 VAC	•
	422–528 VAC	480 VAC	•
Nominal Output Voltage	208 VAC		•
	240 VAC		•
	480 VAC		•
Output Frequency Range	59.3–60.5 Hz		•
AC Voltage Range (Standard)	-12%/+10%		•
Nominal Output Frequency	60 Hz		•
Number of Phases	3		•
Maximum Output Current per Phase	375A	208 VAC	•
	325A	240 VAC	•
	163A	480 VAC	•
CEC-Weighted Efficiency	96%		•
Maximum Continuous Output Power	135 kW (135 kVA)		•
Tare Losses	63.12 W	208 VAC	•
	63.7 W	240 VAC	•
	63.37 W	480 VAC	•
Power Factor at Full Load	>0.99		•
Harmonic Distortion	<3% THD		•

• Standard ○ Optional

Satcon™

PowerGate Plus 135 kW

Output Options

PowerGate Plus 135 kW	
UL/CSA	208 VAC Output
	240 VAC Output
	480 VAC Output

Streamlined Design

With all components encased in a single, space-saving enclosure, PowerGate Plus PV inverters are easy to install, operate, and maintain.

Single Cabinet with Small Footprint

Convenient access to all components

Large in-floor cable glands make access to DC and AC cables easy

Rugged Construction

Engineered for outdoor environments

Output Transformer

Provides galvanic isolation

Matches the output voltage of the PV inverter to the grid

PowerGate Plus 135 kW Specifications		UL/CSA
Temperature		
Operating Ambient Temperature Range (Full Power)	-20° C to +50° C	•
Storage Temperature Range	-30° C to +70° C	•
Cooling	Forced Air	•
Noise		
Noise Level	<65 dB(A)	•
Combiner		
Number of Inputs and Fuse Rating	5 (160A DC)	o
	9 (100A DC)	o
Inverter Cabinet		
Enclosure Rating	NEMA 3R	•
Enclosure Finish (14-Gauge, Powder-Coated G90 Steel)	RAL-7032	•
Cabinet Dimensions (Height x Width x Depth)		80" x 65" x 30.84"
Cabinet Weight		2,684 lbs.
Transformer		
Integrated Internal Transformer		•
Low Tap Voltage[1]	20%	•
Testing and Certification		
UL1741, CSA 107.1-01, IEEE 1547, IEEE C62.41.2, IEEE C62.45, IEEE C37.90.1, IEEE C37.90.2		•
UBC Zone 4 Seismic Rating		•
Warranty		
Five Years		•
Extended Warranty (up to 10, 15, or 20 years)		o
Extended Service Agreement		o
Intelligent Monitoring		
Satcon PV View® Plus		o
Satcon PV Zone®		o
Third-Party Compatibility		•

• Standard
o Optional

[1] The 20% boost tap on the isolation transformer increases the AC voltage output range for applications where the solar array DC operating voltage is at or near the lower end of the DC input range. This boost allows for continued inverter operation at lower DC voltage input levels.

Note: Specifications are subject to change.

Satcon Corporate
27 Drydock Avenue
Boston, MA 02210
P: +1.617.897.2400
F: +1.617.897.2401
E: sales@satcon.com

Satcon West
2925 Bayview Drive
Fremont, CA 94538
P: +1.510.226.3800
F: +1.510.226.3801
E: sales@satcon.com

Satcon Canada
835 Harrington Court
Burlington, ON L7N 3P3
Canada
P: +1.905.639.4692
F: +1.905.639.0961
E: sales@satcon.com

Satcon Greece
Athanasiou Diakou 2 &
Marathonas Ave
Gerakas 15344
Greece
P: +30.210.6654424
F: +30.210.6654425
E: sales@satcon.com

Satcon Czech Republic
Classic 7 Business Park
Jankovcova 1037/49
170 00 Praha 7
Czech Republic
P: +420.255.729.610
F: +420.255.729.611
E: sales@satcon.com

Satcon Shenzhen China
Room 1112, 11/F, International
Chamber of Commerce,
No. 168 FuHua San Road,
FuTian District, Shenzhen, P.R.C.
518048
P: +86.755.6168.2588
F: +86.755.6168.2599
E: sales@satcon.com

Satcon Shanghai China
Room 2308, 23/F, New
HongQiao Center Building,
No. 83 LouGuanShan Road,
Changning District,
Shanghai, P.R.C.
P: +86.139.1811.2818
E: sales@satcon.com

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(F.) Racking specs

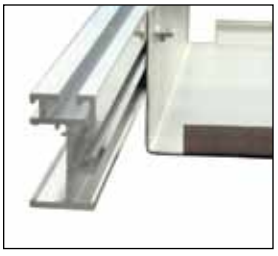
DPW | SOLAR

PREFORMED LINE PRODUCTS

Ballasted Power Rail™

Non-Penetrating Flat Roof Mounting System
for Framed Modules

COMMUNICATIONS ENERGY SPECIAL INDUSTRIES SOLAR



POWER-FAB®

Quality Hardware for the PV Industry

The Ballasted Power Rail™ PV Solar Mounting System

Increased module density

Key Benefits

- Increased module density
- Fast installation times
- Roof layout design flexibility
- Full scale wind tunnel qualification
- Reduced overall installation costs

A unique modular concept provides the flexibility to design and install the grid mounting structure around roof obstructions and avoid shaded areas.

The Ballasted Power Rail system utilizes high strength rails with integrated wiring channels and pre-installed EPDM material to protect the roof surface. Ballast pans provide precise rail alignment. High strength stainless steel clamps secure most framed modules. The top-clamping rail utilizes a single tool with a revolutionary RAD™ fastener for faster bolt placement. The unique shape of the RAD provides an anti-rotation feature locking the bolt in the proper orientation when installed.

Wire management

The high density Ballasted Power Rail top-clamping module system is designed to install fast and provide a secure mounting structure for framed crystalline modules. Qualified test results from a full scale wind tunnel facility support designs that require less ballast weight and no roof penetrations for most site applications

Faster Installation Time – Reduced Labor Costs

Simple layout

Installers prefer a racking system engineered to install quickly, while requiring fewer components to manage on the roof and ultimately assembles hassle-free.

- Single tool
- Precision ballast pans double as rail spacer members and eliminate measuring
- “Set down” fast module assembly
- Top access module clamps – RAD option
- EPDM protection factory installed – no additional mats required
- Compatible with Wiley WEEBS for integral grounding

Fast Top-Down clamping

Installs in 4 Simple Steps

with only 3 hardware components

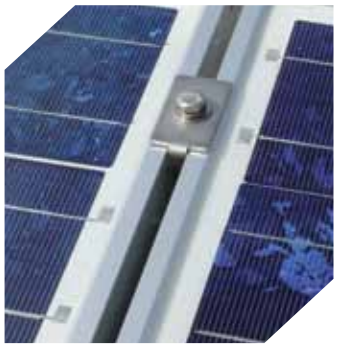
1. Distribute **Module Rails** on the roof
2. Install **Ballast Pans** between rails – no measuring or cutting required
3. Lay down Solar Modules
4. Install top access **Module Clamp**

Full Scale Wind Tunnel Tested and Qualified

High Strength – Long Lasting Construction

System Owners demand a field proven, reliable mounting system designed to withstand environmental conditions for the life of the PV module.

- Full scale wind tunnel qualified
- Corrosion resistant aluminum components
- EPDM protection for roof surfaces
- Stainless steel fasteners
- Unimpeded water drainage



Industry's tightest inter-module spacing

Design Flexibility

Engineers and Architects require a mounting system that offers flexibility in design and application while exceeding building code requirements.

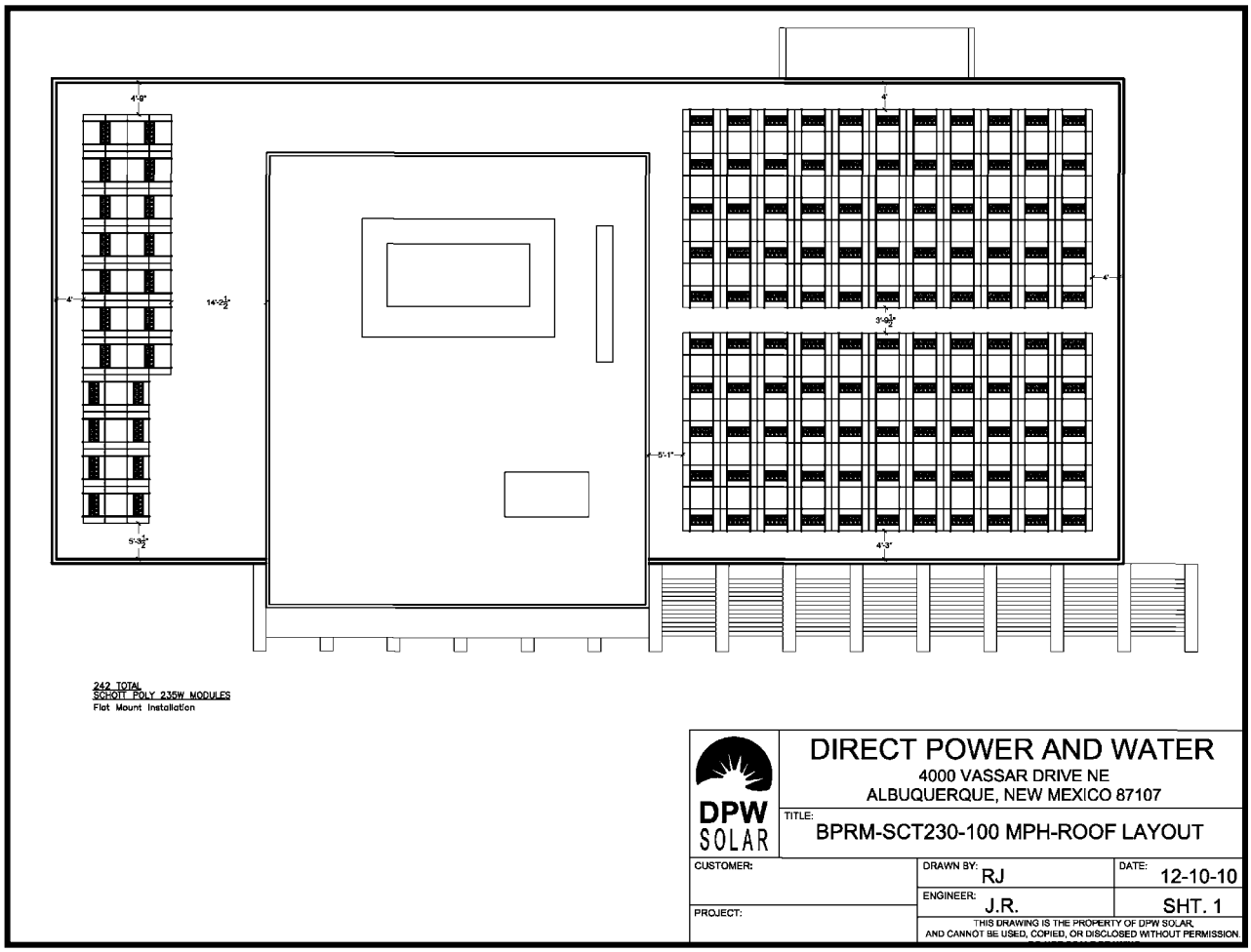
- Configurable around roof obstacles
- Compatible with most framed modules
- Penetration options for seismic regions or reducing ballast loads
- Slotted Ballast Pans for flexibility over roof undulations

Patent Pending

Configurable around roof obstructions

Our engineering staff is available to assist with your next project. Please provide module type, design wind speed, exposure category and building roof layout and height information.

Sample Roof Layout



The Ballasted Power Rail™ System is adaptable to any roof layout.

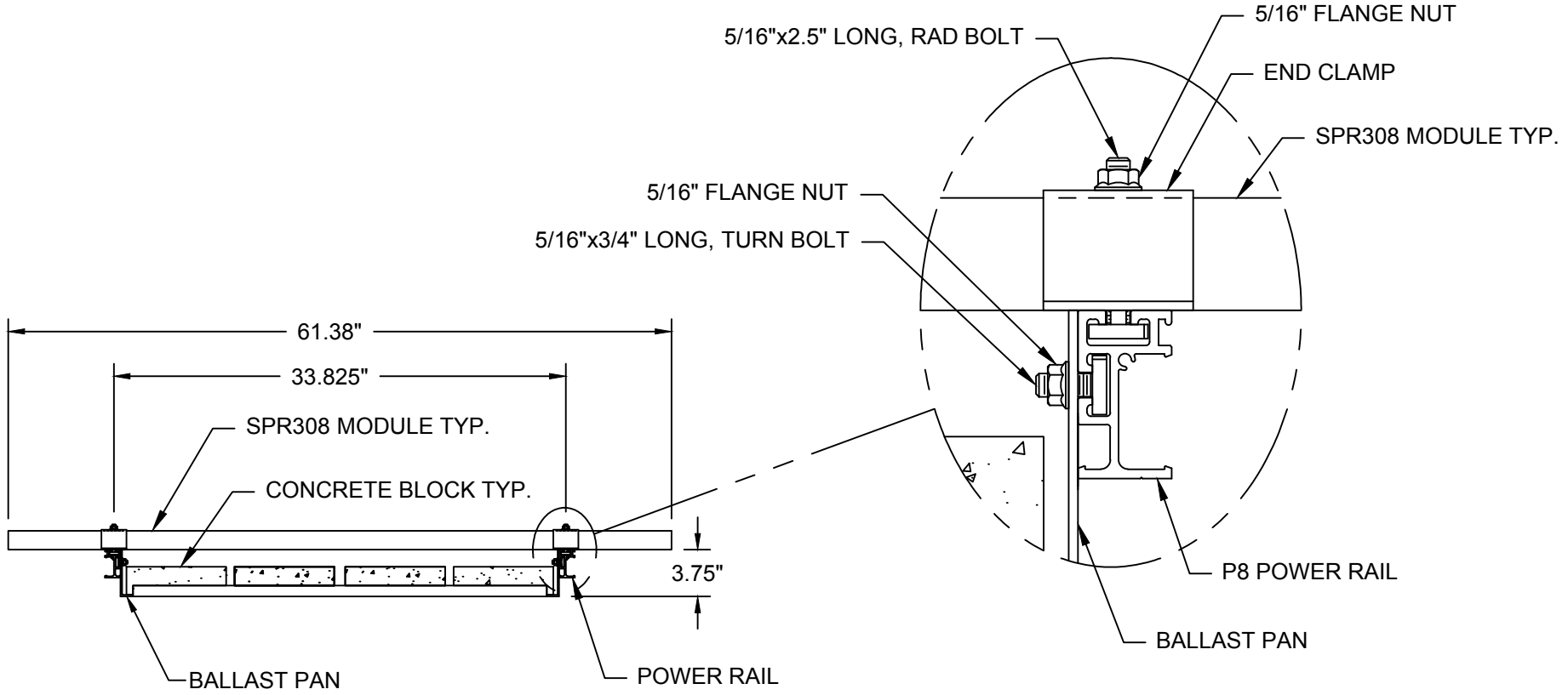
DPW SOLAR

PLP PREFORMED LINE PRODUCTS

4000-B Vassar Drive NE
Albuquerque, New Mexico 87107
USA

Telephone: 800.260.3792
Fax: 505.889.3548
Web Site: www.DPWSolar.com
E-mail: info@power-fab.com

SL-SS-1085
02.11.2M



SIDE VIEW

(PARTIAL, NOT TO SCALE)

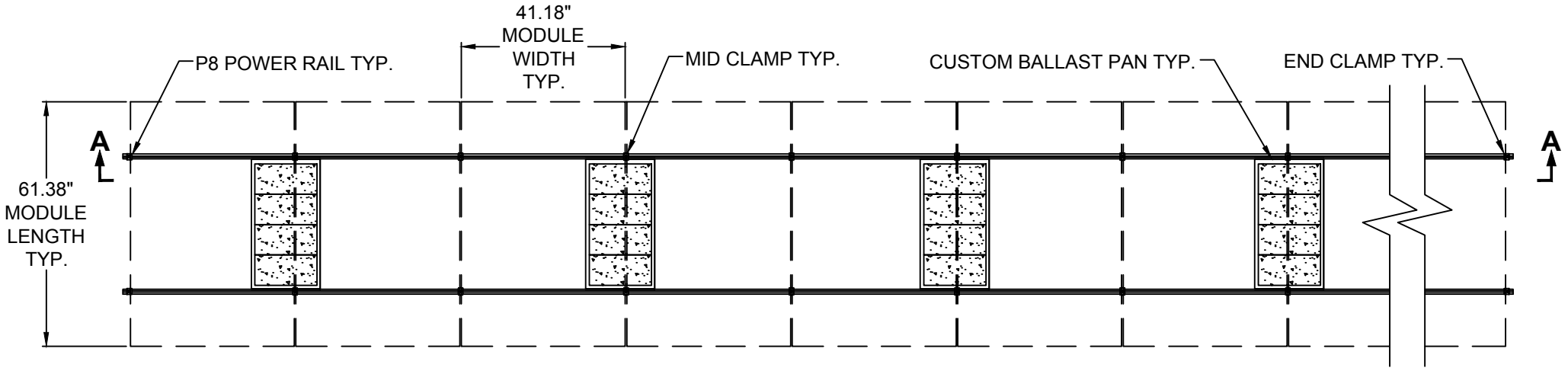
NOTE: ALL HARDWARE IS STAINLESS STEEL

DPW SOLAR

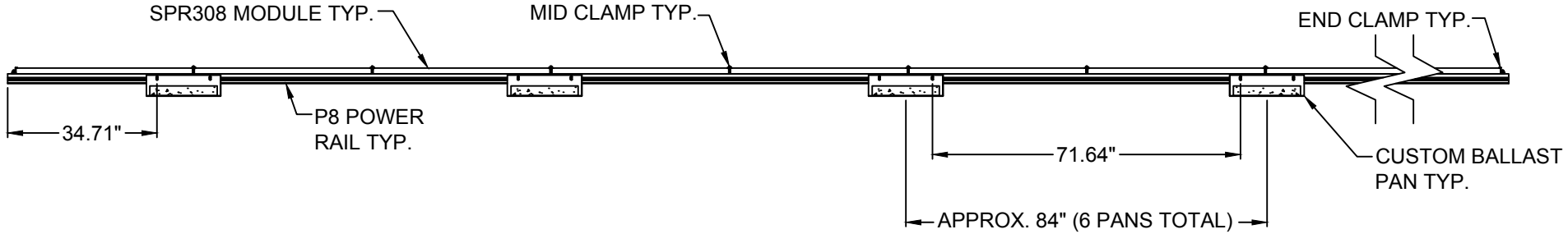
DIRECT POWER AND WATER
4000 VASSAR DRIVE NE
ALBUQUERQUE, NEW MEXICO 87107

TITLE: BPRM-SPR308-90 MPH-20 PSF-RAD

CUSTOMER: BRIGHTERGY	DRAWN BY: RJ	DATE: 5-16-11
	ENGINEER: J.R.	SHEET 2
PROJECT: ROBERT A. YOUNG		



TOP VIEW



SECTION A-A

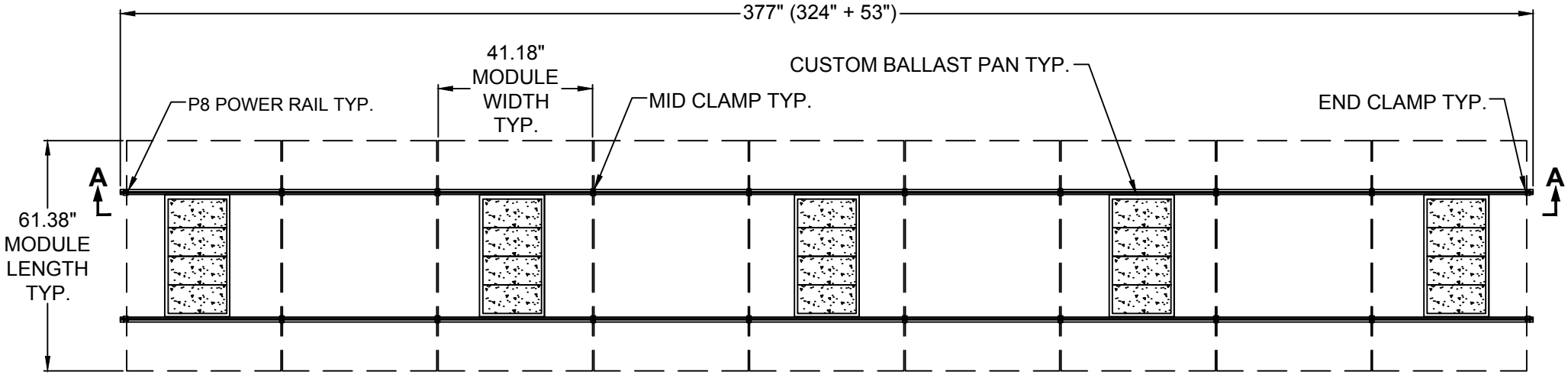
SEE SHT. 2 FOR SIDE VIEW

DPW SOLAR

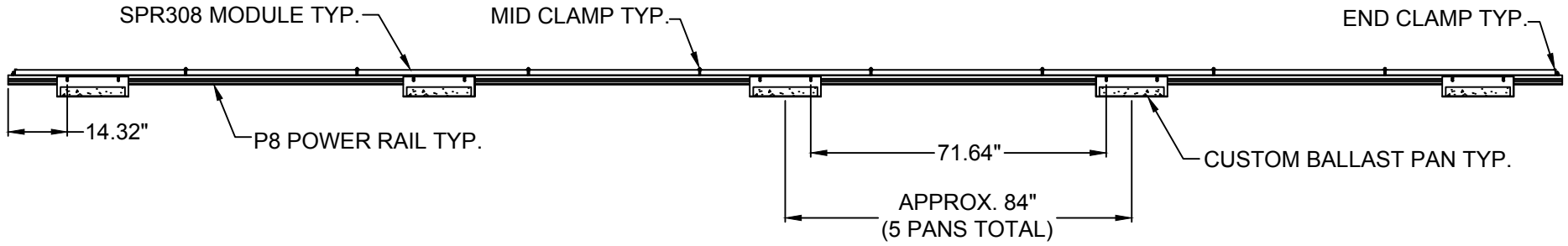
DIRECT POWER AND WATER
4000 VASSAR DRIVE NE
ALBUQUERQUE, NEW MEXICO 87107

TITLE: BPRM12-SPR308-90 MPH-20 PSF-RAD

CUSTOMER: BRIGHTERGY	DRAWN BY: RJ	DATE: 5-16-11
	ENGINEER: J.R.	SHEET 1
PROJECT: ROBERT A. YOUNG		



TOP VIEW



SECTION A-A

SEE SHT. 2 FOR SIDE VIEW

DPW SOLAR

DIRECT POWER AND WATER
4000 VASSAR DRIVE NE
ALBUQUERQUE, NEW MEXICO 87107

TITLE: BPRM9-SPR308-90 MPH-20 PSF-RAD

CUSTOMER: BRIGHTERGY	DRAWN BY: RJ	DATE: 5-16-11
	ENGINEER: J.R.	SHEET 1
PROJECT: ROBERT A. YOUNG		

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(G.) Solar Combiner Box specs

AMTEC SOLAR

Engineering Specification Sheet
EQUINOX 750

GENERAL INFORMATION

- **Description:** Recombiner box with up to eight inputs and 750A of total output.

- **Dimensions:**
  - NEMA 4 Metallic (Standard): 36” x 36” x 10”
  - NEMA 4X Stainless Steel (Optional): 36” x 36” x 10”
  - NEMA 4X Fiberglass (Optional): 36” x 36” x 10”

- **Fuseholders:** Up to eight, depending on total current output.

- **Fuses:** Must be specified at time of order, 35A-200A, total rating of fuses must not exceed 750A. Class RK5, 600VDC.

TECHNICAL SPECIFICATIONS

Input Wires:	35A-60A Fuse Holders:	2-14AWG, 75°C, Cu/Al Wire
	70A-100A Fuse Holders:	2/0-6AWG, 75°C, Cu/Al Wire
	110A- 200A Fuse Holders:	350MCM-6AWG, 75°C, Cu/Al Wire
	Non fused dist. block:	2/0-14AWG, 75°C, Cu/Al Wire
	Grounds:	13 total, 4-14AWG, 90°C, Cu/Al Wire
Output Wires:	Fused, non fused	2 ea., 500MCM-2AWG, 90°C, Cu/Al Wire
	Ground:	2 ea., 350MCM-6AWG, 90°C, Cu/Al Wire
Operating Temperature, Humidity:		-10°C to +60°C (15°F to 130°F), 0-100% Humidity

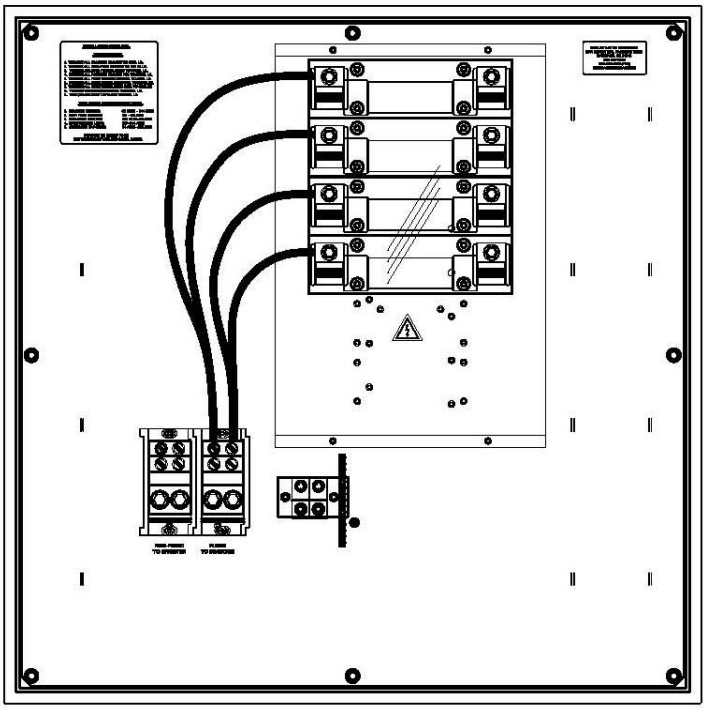
FEATURES

- **Labeling:** All components, wire ranges, torque values silkscreened onto backpan.
- **Mounting panel:** White powder coat with hydraulically inserted threaded nuts for maximum gripping strength.
- **Plastic Shields:** Protect users from all live parts, provide completely deadfront unit.
- **Monitoring**: Integrated monitoring available, with RS485 ModBus output.
- **Padlockable Handle**: To prevent unauthorized access.

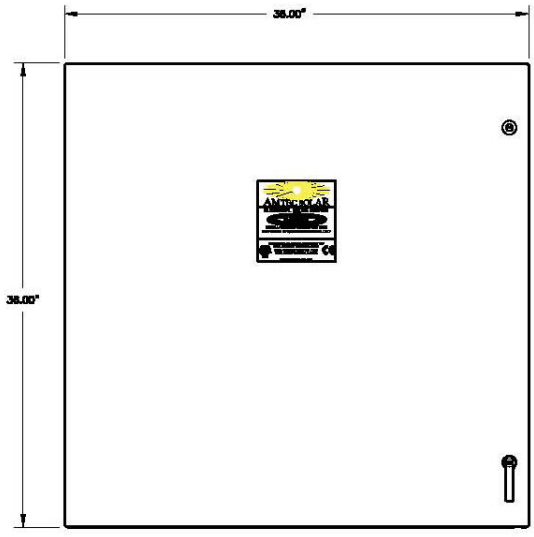
APPROVALS

- Listed to UL1741, CAN/CSA C22.2 Listed, CE Listed

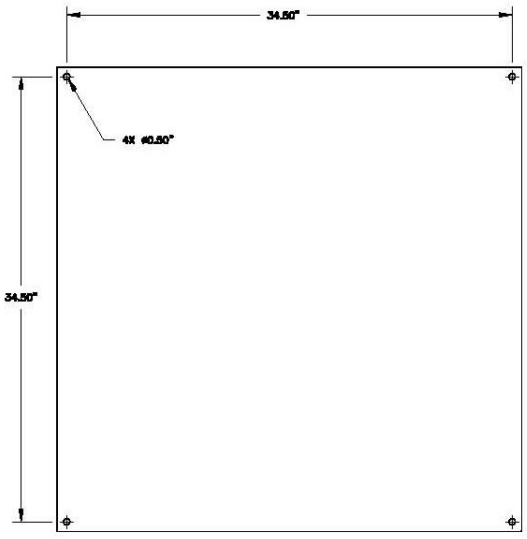
AMtec Solar
2501 Industrial Parkway West, Hayward CA 94545
www.amtecsolar.com
510.887.2289



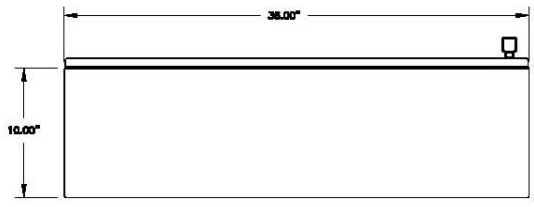
—Drawing above shows 200A fuse holders



Front View



Rear View – Mounting Locations



Bottom View

—Layouts shown are for standard NEMA 4 metallic enclosure—

AMtec Solar
2501 Industrial Parkway West, Hayward CA 94545
www.amtecsolar.com
510.887.2289

Engineering Specification Sheet

PROMINENCE SERIES 24 string combiner box with 200 amp disconnect switch

GENERAL INFORMATION

- **Description:** 24 string fused combiner box with 200A disconnect. 200A at 600VDC maximum output.

- **Dimensions:**

		Part number
NEMA 4X Fiberglass (Standard):	25.59” x 25.59” x 10.39”, 55lbs.	PR-24-200-FG
NEMA 4 Metallic (Optional):	25.59” x 25.59” x 10.39”, 62lbs.	PR-24-200-S
NEMA 4X 316 Stainless (Optional)	25.59” x 25.59” x 10.39”, 62lbs.	PR-24-200-SS

- **Fuse holders:** 24 finger safe, non-load break fuse holders. 30A, 1000VDC rated.

TECHNICAL SPECIFICATIONS

- **Disconnect Switch:** 600 VDC, 200A, load break, rated for continuous duty class DC-21.

Input Wires:	Fuses:	24 total, 8-14AWG, 75°C, Cu Wire
Output Wires:	Fused, Non-Fused:	1 ea. 350MCM-6AWG, 90°C, Cu/Al Wire
Ground Terminals:		2 ea. 350MCM-6AWG, 90°C, Cu/Al Wire 13 total, 4-14AWG, 90°C, Cu/Al Wire
Operating Temperature, Humidity:		-10°C to +60°C (15°F to 130°F), 0-100% Humidity

- **Busbars:** C11000 Alloy (Copper), electroplated to prevent corrosion. Rated continuous duty.

FEATURES

- **Safety shields:** Lexan shields over all live parts for a completely deadfront unit.
- **Labeling:** All components, wire ranges, torque values silkscreened onto backpan.
- **Mounting panel:** White powder coat with integrated wire management, hydraulically inserted threaded nuts for maximum gripping strength.
- **Insulators:** All busbars are supported by 1000VDC rated insulators for added rigidity.

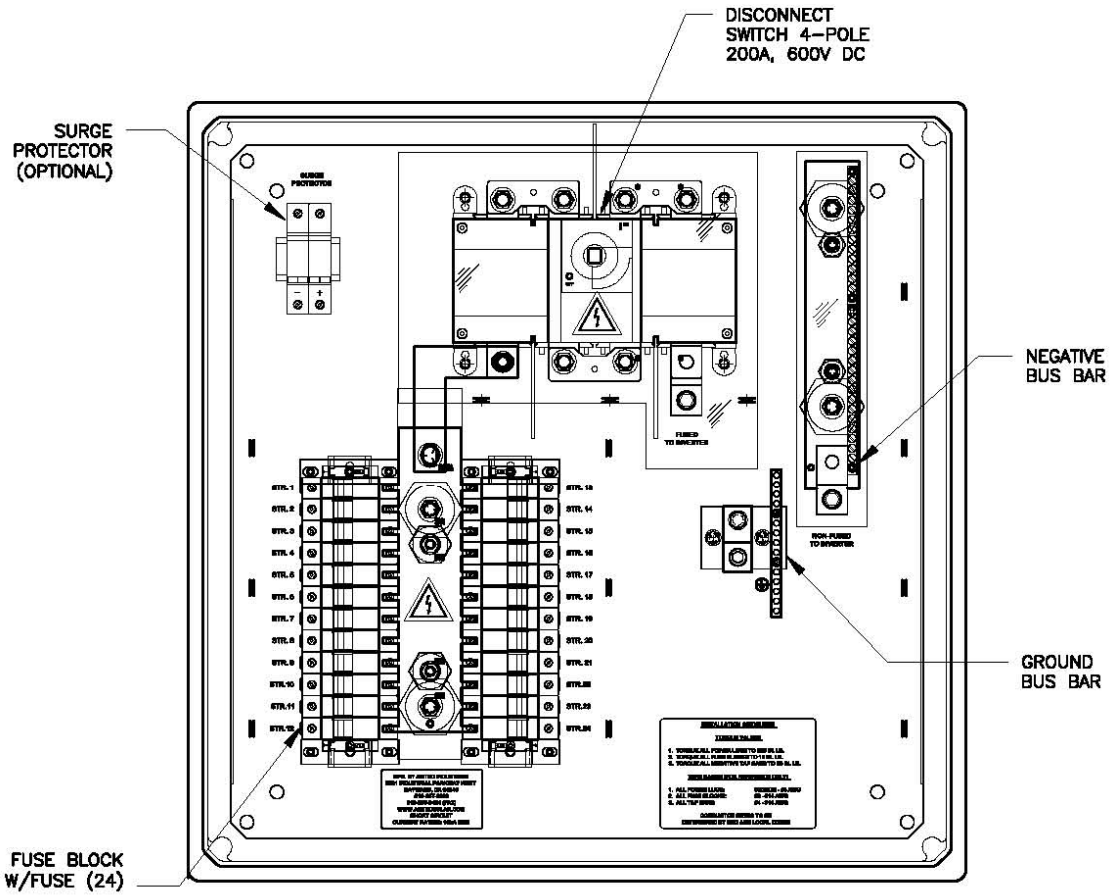
OPTIONS

- **Surge Protection:** Surge protection can be added for an additional cost. Just add “SP” at the end of part number.

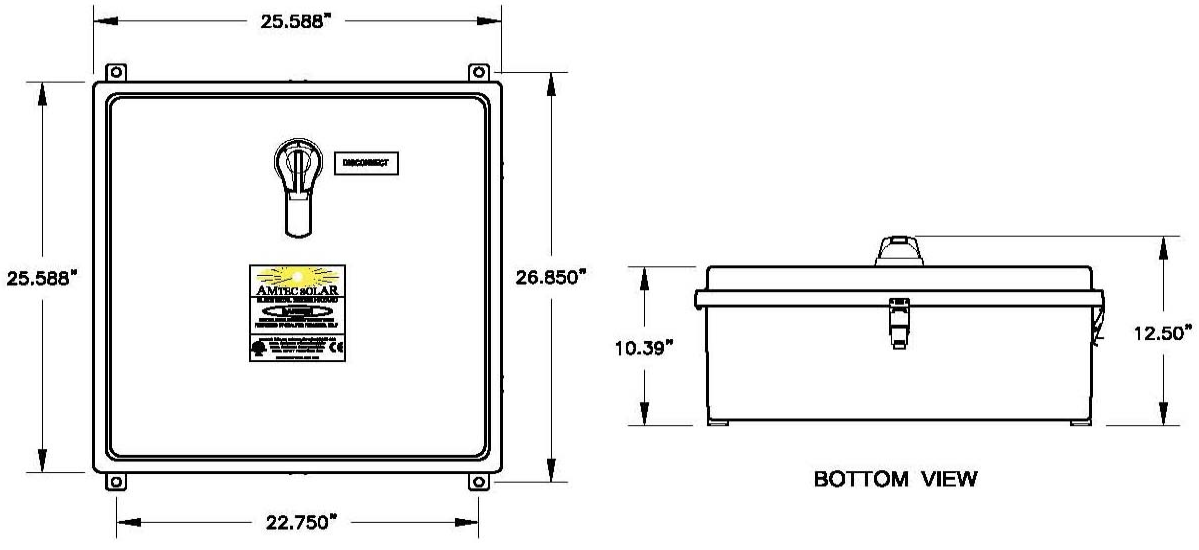
APPROVALS

- Listed to UL1741, CAN/CSA C22.2 Listed @ 600Volts, CE Listed @ 1000Volts.

AMtec Solar
2501 Industrial Parkway West, Hayward CA 94545
www.amtecsolar.com
510.887.2289



DRAWING ABOVE SHOWS INTERNAL COMPONENTS



FRONT VIEW
WITH MOUNTING LOCATIONS

BOTTOM VIEW

-Layouts shown are for standard fiberglass enclosure-

AMtec Solar
2501 Industrial Parkway West, Hayward CA 94545
www.amtecsolar.com
510.887.2289

Engineering Specification Sheet

PROM12-100-600V

GENERAL INFORMATION

- **Description:** 12 string fused combiner box with 100A disconnect. 100A at 600VDC maximum output.

- **Dimensions:**
  - NEMA 4X Fiberglass (Standard): 20” x 16” x 8”, 39 lbs.
  - NEMA 4 Metallic (Optional): 20” x 16” x 8”, 43 lbs.
  - NEMA 4X 316 Stainless (Optional) 20” x 16” x 8”, 42 lbs.
  - NEMA 3R (Optional) 20” x 16” x 6”, 36 lbs.

- **Fuseholders:** 12 fingersafe, non-load break fuseholders. 30A, 1000VDC rated.

TECHNICAL SPECIFICATIONS

- **Disconnect Switch:** 600 VDC, 100A, load break, rated for continuous duty class DC-21.

- **Input Wires**: Fuses: 12 total, 8-14AWG, 75°C, Cu Wire
  Grounds: 13 total, 4-14AWG, 90°C, Cu/Al Wire

- **Output Wires:** Pos., Neg., Ground: 1 ea., 350MCM-6AWG, 90°C, Cu/Al Wire

- **Operating Temperature, Humidity:** -10°C to +60°C (15°F to 130°F), 0-100% Humidity

- **Busbars:** C11000 Alloy (Copper), electroplated to prevent corrosion. Rated continuous duty.

FEATURES

- **Safety shields:** Lexan shields over all live parts for a completely deadfront unit.
- **Labeling:** All components, wire ranges, torque values silkscreened onto backpan.
- **Mounting panel:** White powder coat with integrated wire management, hydraulically inserted threaded nuts for maximum gripping strength.
- **Insulators:** All busbars are supported by 1000VDC rated insulators for added rigidity.

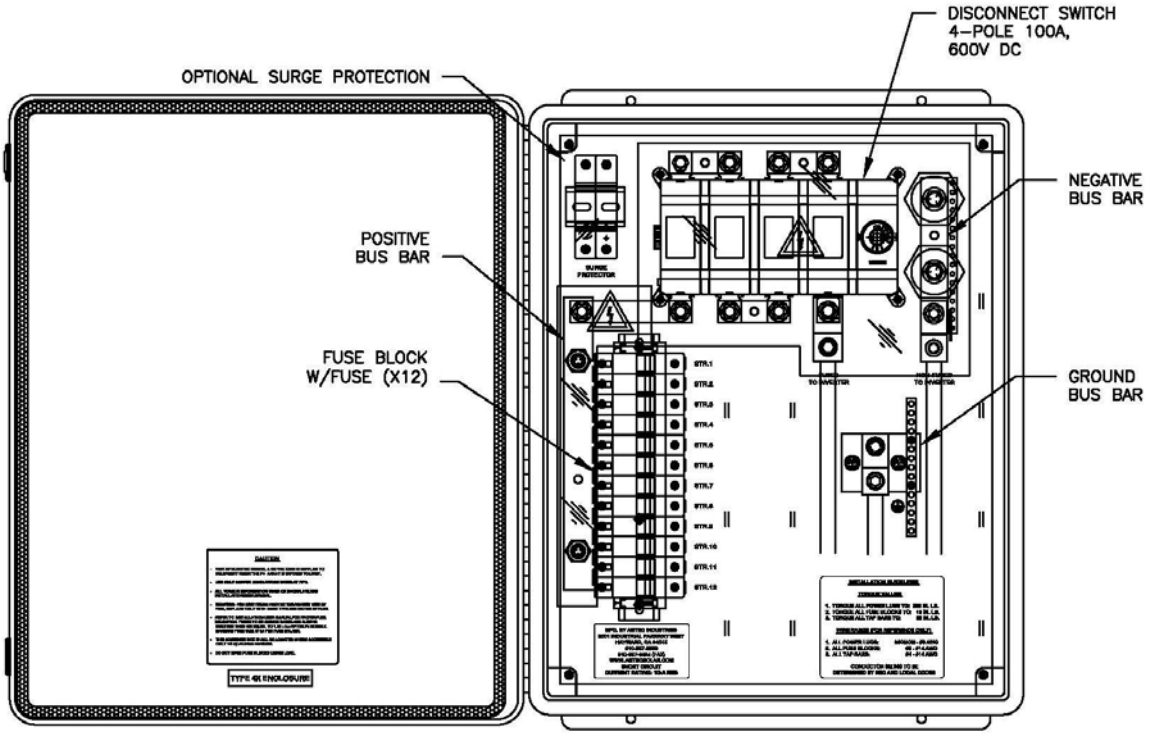
OPTIONS

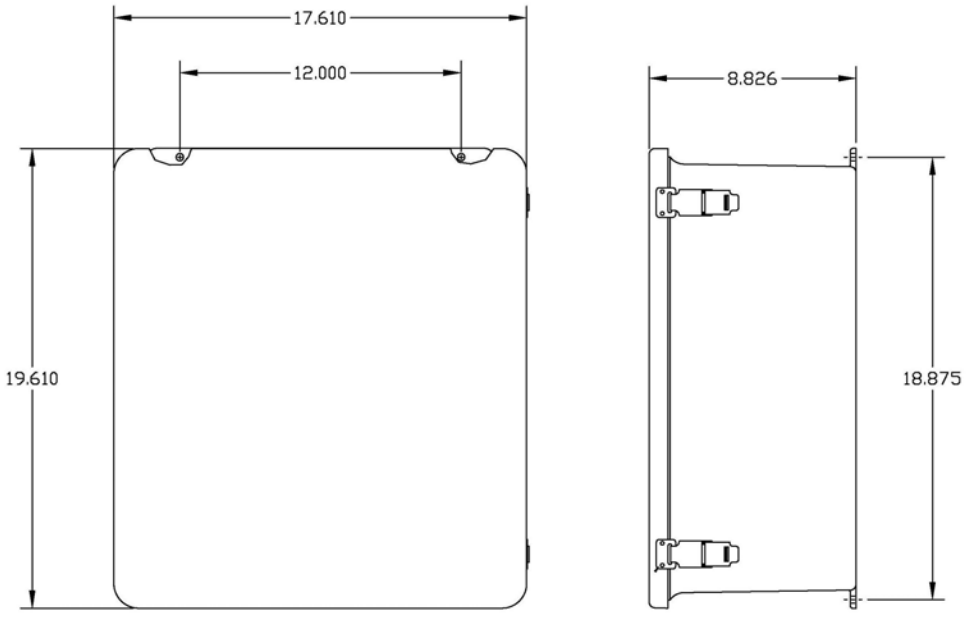
- **Surge Protection:** Surge protection can be added for an additional cost.

APPROVALS

- Listed to UL1741, CAN/CSA C22.2 Listed, CE Listed

AMtec Solar
2501 Industrial Parkway West, Hayward CA 94545
www.amtecsolar.com
510.887.2289





-Layouts shown are for standard fiberglass enclosure-

AMtec Solar
2501 Industrial Parkway West, Hayward CA 94545
www.amtecsolar.com
510.887.2289

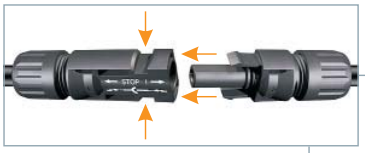
15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(H.)Solar Connector specs

Steckverbindersystem für die Photovoltaik

Connector system for photovoltaic

Système de connexion pour le photovoltaïque



Verriegelungssystem
Locking system
Système de verrouillage

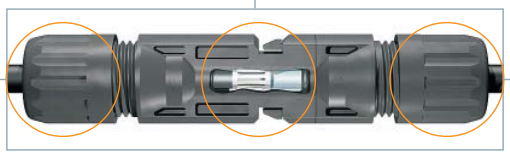
Mit Sicherungshülse welche nur mit Werkzeug trennbar ist (NEC 2008 konform)

With safety clip that requires a tool to unlock (NEC2008 compliant)

Avec clip de sécurité nécessitant un outil pour déverouiller (NEC2008 conforme)

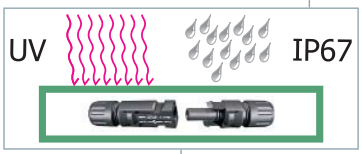
IP2X (IEC 60529)
IP2X (CEI 60529)

Ungesteckt berührgeschützt
Unmated touch protected when
Protection au toucher, débroché



Kabelzugentlastung, Kontaktlamelle = Langzeitstabilität
Cable strain relief, Multilam = long term stability
Rétention du câble, Contact à lamelles = stable à long terme

UL-Recognized
EN 50521



geschützt
protected
protégé

Zertifiziert für Anwendungen mit Modulen nach IEC 61730

Certified for applications with modules according to IEC 61730

Certifié pour applications avec des modules selon CEI 61730

Schutzklasse II
Safety class II
Classe de protection II

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(I.) Required Penetration “Firestop” specs

ONLINE CERTIFICATIONS DIRECTORY

XHEZ.F-A-1009
Through-penetration Firestop Systems

Page Bottom

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Listed or Classified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered as Classified, Listed, or Recognized.

Through-penetration Firestop Systems

See General Information for Through-penetration Firestop Systems

System No. F-A-1009

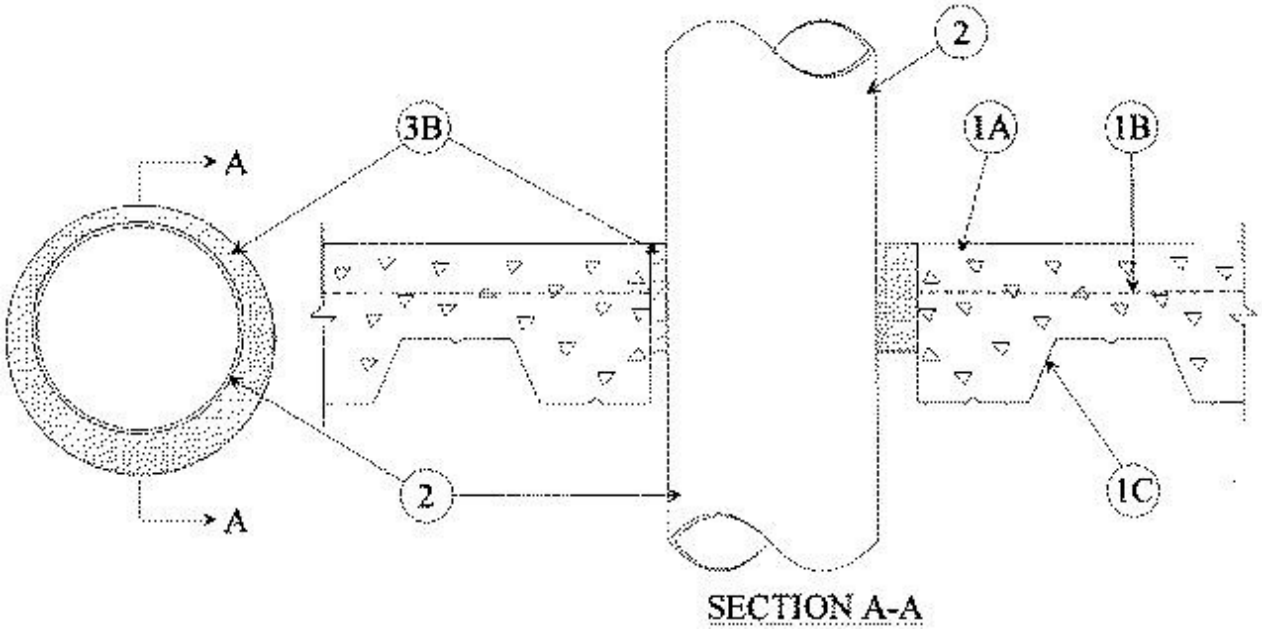
December 24, 1996

F Ratings — 2 & 3 Hr (See Item 1A)

T Rating — 0 Hr

L Rating At Ambient — Less Than 1 CFM/Sq Ft

L Rating At 400 F — Less Than 1 CFM/Sq Ft



SECTION A-A

1. **Floor-Ceiling Assembly —** The fire-rated unprotected steel deck Floor-Ceiling assembly shall be constructed of the materials and in the manner specified in the individual D900 Series Designs in the UL Fire Resistance Directory and as summarized below:

A. **Normal Weight or Lightweight Concrete —** Concrete thickness above the crest of the deck shall be min 3-1/4 in. for 2 Hr F Rating and 4-1/4 in. for 3 Hr F Rating. Normal weight concrete with carbonate or siliceous aggregate, 145 to 155 pcf unit weight, min 3000 psi compressive strength. Lightweight concrete with expanded shale, clay or slate aggregate, 105 to 115 pcf unit weight, min 3000 psi compressive strength.

B. **Welded Wire Fabric —** 6x6, W1.4xW1.4.

C. **Steel Floor and Form Units* —** Composite or noncomposite 1-5/16 to 3 in. deep galv units as specified in the individual Floor-Ceiling designs. Max diam of opening is 41-1/4 in.

2. **Through Penetrants —** One metallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 1-1/2 in. to max 3-3/4 in. The following types of pipe, conduit or tubing may be used:

A. **Steel Pipe —** Nom 36 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 36 in. diam (or smaller) cast or ductile iron pipe.

C. **Conduit —** Nom 6 in. diam (or smaller) rigid steel conduit.

D. **Conduit —** Nom 4 in. diam (or smaller) steel electrical metallic tubing.

E. **Copper Tubing —** Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.

F. **Copper Pipe —** Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.

3. **Firestop System —** The firestop system shall consist of the following:

A. **Forms —** (Not shown) — Used as a form to prevent leakage of fill material during installation. Forms to be a rigid sheet material, cut to fit the contour of penetrating item and positioned as required to accommodate the required thickness of fill material. Forms may be removed after fill material has cured.

B. **Fill, Void or Cavity Material* — Mortar —** Min 2-1/2 in. thickness of fill material applied within annulus, flush with top surface of floor. Mortar to be mixed with water at a rate of 1.9 to 2.4 gal (7-9 liters) per 25 lb bag in accordance with manufacturers installation instructions.

ISOLATEK INTERNATIONAL — CAFCO® TPS Mortar

*Bearing the UL Classification Mark

Last Updated on 1996-12-24

Questions? Print this page Notice of Disclaimer Page Top

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(J.)System monitoring specs

Satcon® Powergate Plus Series Inverters

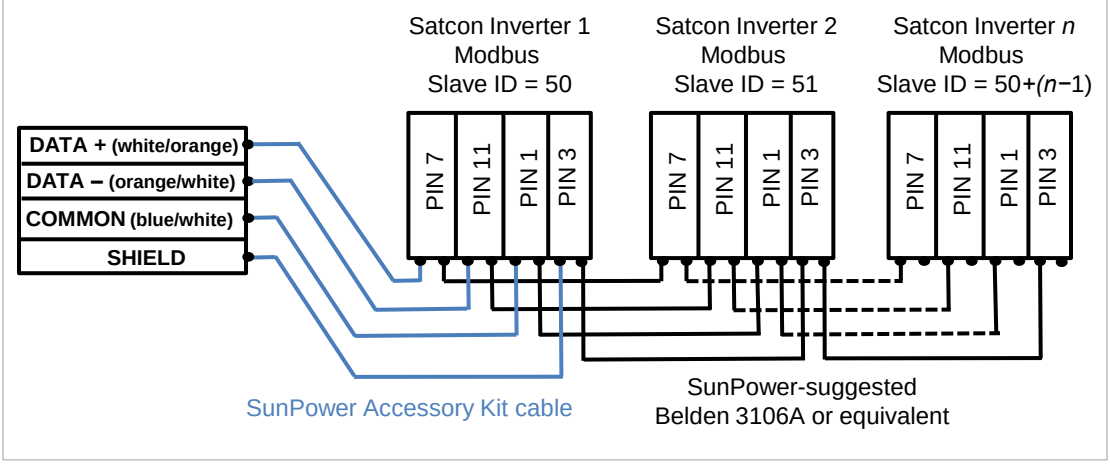
SunPower Device Guide

INSTALLATION OUTLINE

Note. On some PowerGate Plus inverter models, the common wire is connected to pin 9 rather than pin 1. Consult your inverter manual.

1. Wire the first Satcon inverter in the daisy chain to the SunPower Monitoring System according to the appropriate wiring configuration. Refer to Section 1, 2, or 3.
2. Wire the remaining Satcon inverters in the daisy chain. Refer to Section 4.
3. Verify the jumper settings for each Satcon inverter. Refer to Section 5.
4. Verify the communication settings for each Satcon inverter. Refer to Section 6.

1 Core Wiring Configuration with SunPower Homerun Cable

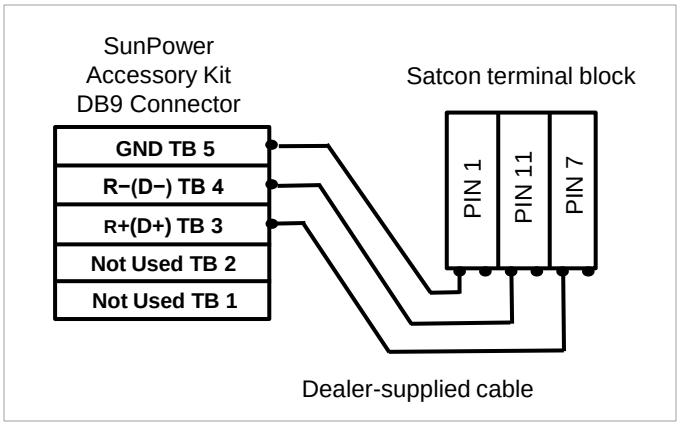


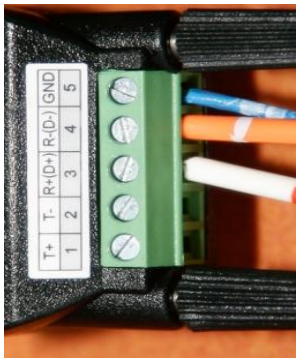
Satcon inverter terminal block

Connect the SunPower Accessory Kit cable to port P2 of the PV Supervisor. Connect wires according to the diagram above.

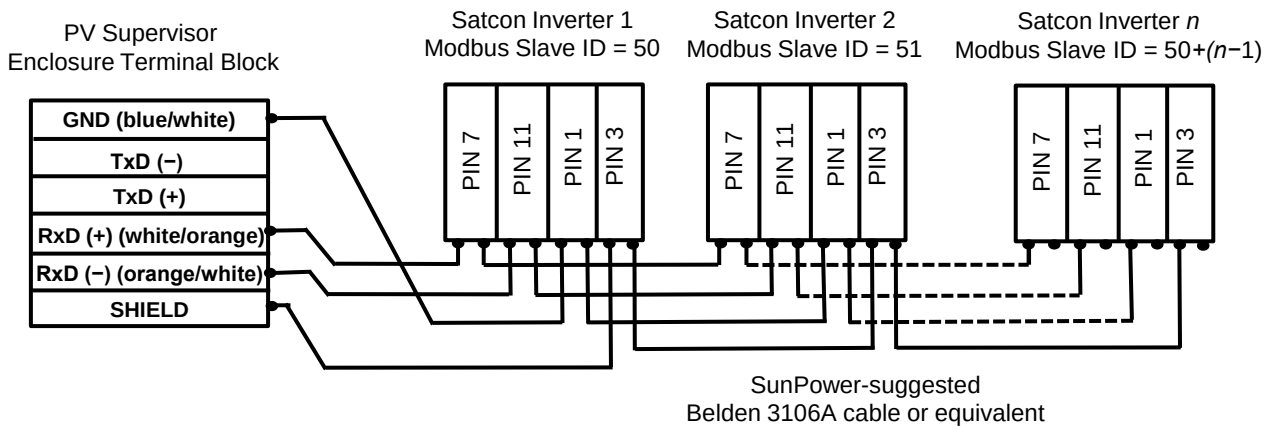
2 Core Wiring Configuration with Dealer-supplied Homerun Cable

Connect the dealer-supplied homerun cable to port P2 of the PV Supervisor using the SunPower Accessory Kit DB9 connector. Connect wires according to the diagram on the right.

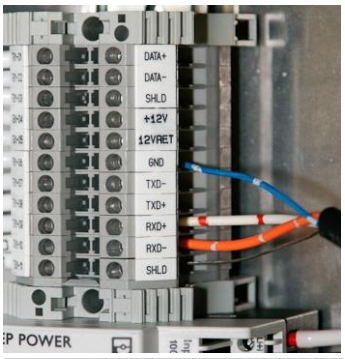




3 Plus/Premium Wiring Configuration

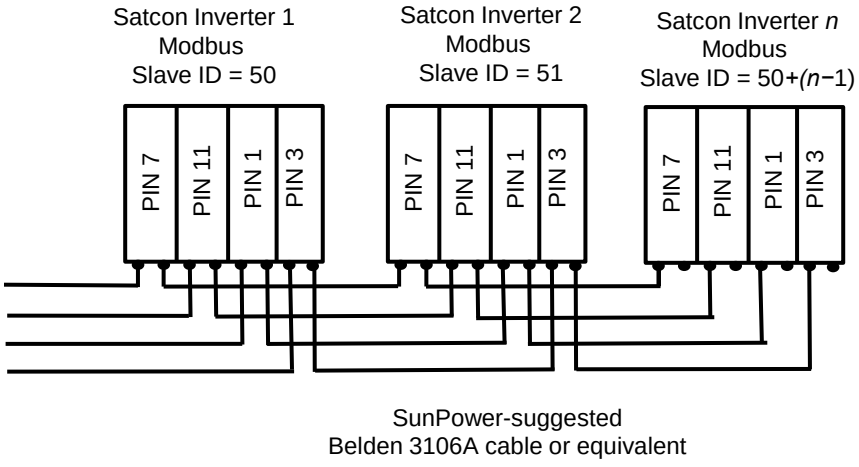


Using the dealer-installed conduit, connect the Belden 3106A or equivalent homerun cable to the PV Supervisor enclosure terminal block. Connect wires according to the diagram above.



PV Supervisor
Enclosure Terminal Block

4 Daisy Chain Wiring Detail

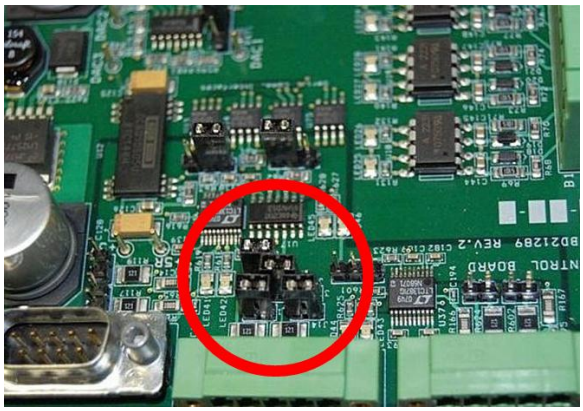


All inverters except the last in the daisy chain will have both incoming and outgoing cables.

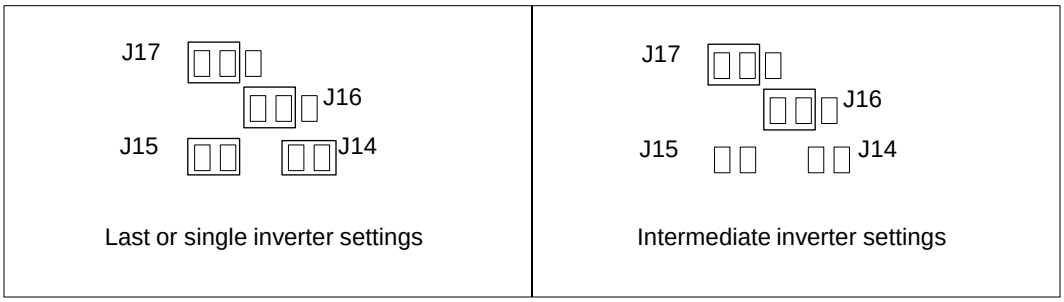
Trim and then twist the wires before you land them in the appropriate location on the terminal block.

5 DCPB-7 COM Board Settings

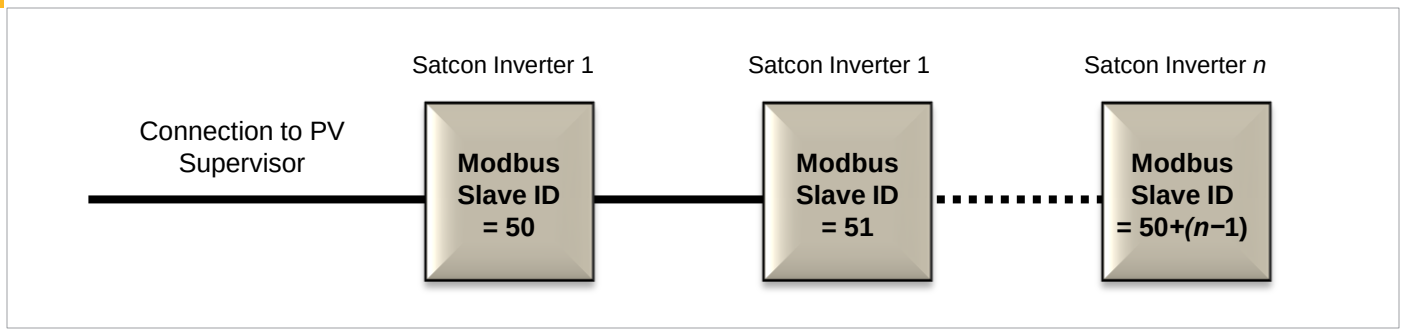
- Configure the inverters for 2-wire RS485 communications by setting the J16 and J17 jumpers in the 1-2 position.
- Configure the last inverter in the daisy chain (or single inverter) for 120 ohm termination resistance by setting the J14 and J15 jumpers in the 1-2 position.
- Remove the termination jumpers from the main board of the other inverters in the daisy chain.



Satcon DCPB-7 board



6 Keypad Settings



1. Access the inverter menu using password *5432.*
2. Navigate through the Operations menu to the Slave ID screen.
3. Set the Modbus Slave ID for each inverter according to the diagram.
4. Navigate to the Communications screen and verify the following configuration settings:
   - Baud rate = *9600*
   - Parity bit = *0*
   - Data bits = *8*
   - Stop bit = *1*

15209 West 99th Street
Lenexa, Kansas 66219
913.735.9733
www.brightergy.com

(K.)Warranty Information

SUNPOWER LIMITED WARRANTY FOR PV MODULES

Applies to the following models:
SPR-yyyEz-xxx-x – where yyy is a module power rating between 90 and 430 Watts
SPR-yyyz-xxx-x, where yyy is a module power rating between 80 and 420 Watts.
T5-SPR-yyy, where yyy is a module power rating between 290 and 325 Watts.
Serengeti branded pv modules: SER-yyyz, where yyy is a module power rating between 200 and 290 Watts
("xxx-x" "z" defines product variants)

1. Limited Product Warranty – Ten (10) Year Repair, Replacement or Refund Remedy

SunPower Corporation with offices at 3939 North First Street, San Jose, CA 95134 ("SunPower") warrants that for ten (10) years from the date of delivery, its Photovoltaic modules ("PV modules") shall be free from defects in materials and workmanship under normal application, installation, use and service conditions. If the PV modules fail to conform to this warranty, then for a period ending ten (10) years from date of delivery to the original end-customer ("the Customer"), SunPower will, at its option, either repair or replace the product, or refund the purchase price as paid by the Customer ("Purchase Price"). The repair, replacement or refund remedy shall be the sole and exclusive remedy provided under the Limited Product Warranty and shall not extend beyond the ten (10) year period set forth herein. This Limited Product Warranty does not warrant a specific power output, which shall be exclusively covered under clause 2 hereinafter (Limited Power Warranty).

2. Limited Power Warranty

a) SunPower additionally warrants: If, within twelve (12) years from date of delivery to the Customer any PV module(s) exhibits a power output less than 90% of the Minimum Peak Power[1] as specified at the date of delivery in SunPower's Product datasheet, provided that such loss in power is determined by SunPower (at its sole and absolute discretion) to be due to defects in material or workmanship SunPower will replace such loss in power by either providing to the Customer additional PV modules to make up such loss in power or by providing monetary compensation equivalent to the cost of additional PV modules required to make up such loss in power or by repairing or replacing the defective PV modules, at the option of SunPower
b) SunPower additionally warrants: If, within twenty five (25) years from date of delivery to the Customer any PV module(s) exhibits a power output less than 80% of the Minimum Peak Power[1] as specified at the date of delivery in SunPower's Product datasheet, provided that such loss in power is determined by SunPower (at its sole and absolute discretion) to be due to defects in material or workmanship SunPower will replace such loss in power by either providing to the Customer additional PV modules to make up such loss in power or by providing monetary compensation equivalent to the cost of additional PV modules required to make up such loss in power or by repairing or replacing the defective PV modules, at the option of SunPower.

3. Exclusions and limitations

a) Warranty claims must in any event be filed within the applicable Warranty period.
b) Warranty claims may only be made by, or on the behalf of, the original end customer or a person to whom title has been transferred for the PV Modules.

---

[1] *"Minimum Peak Power" = Peak power minus the Peak power tolerance (as specified in SunPower's Product datasheet). "Peak power" is the power in peak watts that a PV module generates at STC (Standard Test conditions: Irradiance of 1000 W/m^2, light spectrum AM 1.5g and a cell temperature of 25 degrees C)*

c) The Limited Warranties do not apply to any of the following:
    1. PV modules which in SunPower's absolute judgment have been subjected to: misuse, abuse, neglect or accident; alteration, improper installation, application or removal (including but not limited to installation, application or removal by any party other than a SunPower authorized dealer; non-observance of the applicable SunPower installation, users and/or maintenance instructions; repair or modifications by someone other than an approved service technician of SunPower; power failure surges, lightning, flood, fire, accidental breakage or other events outside SunPower's control.
    2. Cosmetic defects stemming from normal wear and tear of PV module materials.
    3. PV modules installed in locations, which in SunPower's absolute judgment may be subject to direct contact with salt water.
d) The Limited Warranties do not cover any transportation costs for return of the PV modules, or for reshipment of any repaired or replaced PV modules, or cost associated with installation, removal or reinstallation of the PV modules.
e) When used on a mobile platform of any type, the Limited Power Warranty, applying to any of the PV modules shall be limited to twelve (12) years as per the provisions of clause 2(a) hereof.
f) Warranty claims will not apply if the type or serial number of the PV modules is altered, removed or made illegible.

4. Limitation of Warranty Scope

SUBJECT TO THE LIMITIATIONS UNDER APPLICABLE LAW, THE LIMITED WARRANTIES SET FORTH HEREIN ARE EXPRESSLY IN LIEU OF AND EXCLUDE ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR PARTICULAR PURPOSE, USE, OR APPLICATION, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF SUNPOWER, UNLESS SUCH OTHER WARRANTIES, OBLIGATIONS OR LIABILITIES ARE EXPRESSLY AGREED TO IN WRITING SIGNED AND APPROVED BY SUNPOWER. SUNPOWER SHALL HAVE NO RESPONSIBILITY OR LIABILITY WHATSOEVER FOR DAMAGE OR INJURY TO PERSONS OR PROPERTY OR FOR OTHER LOSS OR INJURY RESULTING FROM ANY CAUSE WHATSOEVER ARISING OUT OF OR RELATED TO THE PRODUCT, INCLUDING, WITHOUT LIMITATION, ANY DEFECTS IN THE MODULE, OR FROM USE OR INSTALLATION. UNDER NO CIRCUMSTANCES SHALL SUNPOWER BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, HOWSOEVER CAUSED. LOSS OF USE, LOSS OF PROFITS, LOSS OF PRODUCTION, LOSS OF REVENUES ARE THEREFORE SPECIFICALLY BUT WITHOUT LIMITATION EXCLUDED.

SUNPOWER'S AGGREGATE LIABILITY, IF ANY, IN DAMAGES OR OTHERWISE, SHALL NOT EXCEED THE PURCHASE PRICE PAID TO SUNPOWER BY THE CUSTOMER, FOR THE UNIT OF PRODUCT OR SERVICE FURNISHED OR TO BE FURNISHED, AS THE CASE MAY BE, WHICH GAVE RISE TO THE WARRANTY CLAIM.

SOME STATES DO NOT ALLOW LIMITATIONS ON IMPLIED WARRANTIES OR THE EXCLUSION OF DAMAGES SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

5. Obtaining Warranty Performance

If you feel you have a justified claim covered by this Limited Warranty, immediately notify the (a) Installer, who sold the PV-modules, or (b) any authorized SunPower distributor, of the claim in writing, or (c) send such notification to SunPower Corporation, 3939 North First Street, San Jose, CA 95134, directly. In addition, please enclose evidence of the date of delivery of the PV module. If applicable, your installer or distributor will give advice on handling the claim. If further assistance is required, please write to SunPower for instructions. The return of any PV-modules will not be accepted unless prior written authorization has been given by SunPower.

PowerGate Plus 135 kW

Output Options

PowerGate Plus 135 kW	
UL/CSA	208 VAC Output
	240 VAC Output
	480 VAC Output

Streamlined Design

With all components encased in a single, space-saving enclosure, PowerGate Plus PV inverters are easy to install, operate, and maintain.

Single Cabinet with Small Footprint

Convenient access to all components

Large in-floor cable glands make access to DC and AC cables easy

Rugged Construction

Engineered for outdoor environments

Output Transformer

Provides galvanic isolation

Matches the output voltage of the PV inverter to the grid

PowerGate Plus 135 kW Specifications		UL/CSA
Temperature		
Operating Ambient Temperature Range (Full Power)	-20° C to +50° C	•
Storage Temperature Range	-30° C to +70° C	•
Cooling	Forced Air	•
Noise		
Noise Level	<65 dB(A)	•
Combiner		
Number of Inputs and Fuse Rating	5 (160A DC)	o
	9 (100A DC)	o
Inverter Cabinet		
Enclosure Rating	NEMA 3R	•
Enclosure Finish (14-Gauge, Powder-Coated G90 Steel)	RAL-7032	•
Cabinet Dimensions (Height x Width x Depth)		80" x 65" x 30.84"
Cabinet Weight		2,684 lbs.
Transformer		
Integrated Internal Transformer		•
Low Tap Voltage[1]	20%	•
Testing and Certification		
UL1741, CSA 107.1-01, IEEE 1547, IEEE C62.41.2, IEEE C62.45, IEEE C37.90.1, IEEE C37.90.2		•
UBC Zone 4 Seismic Rating		•
Warranty		
Five Years		•
Extended Warranty (up to 10, 15, or 20 years)		o
Extended Service Agreement		o
Intelligent Monitoring		
Satcon PV View® Plus		o
Satcon PV Zone®		o
Third-Party Compatibility		•

• Standard
o Optional

[1] The 20% boost tap on the isolation transformer increases the AC voltage output range for applications where the solar array DC operating voltage is at or near the lower end of the DC input range. This boost allows for continued inverter operation at lower DC voltage input levels.

Note: Specifications are subject to change.

Satcon Corporate
27 Drydock Avenue
Boston, MA 02210
P: +1.617.897.2400
F: +1.617.897.2401
E: sales@satcon.com

Satcon West
2925 Bayview Drive
Fremont, CA 94538
P: +1.510.226.3800
F: +1.510.226.3801
E: sales@satcon.com

Satcon Canada
835 Harrington Court
Burlington, ON L7N 3P3
Canada
P: +1.905.639.4692
F: +1.905.639.0961
E: sales@satcon.com

Satcon Greece
Athanasiou Diakou 2 &
Marathonas Ave
Gerakas 15344
Greece
P: +30.210.6654424
F: +30.210.6654425
E: sales@satcon.com

Satcon Czech Republic
Classic 7 Business Park
Jankovcova 1037/49
170 00 Praha 7
Czech Republic
P: +420.255.729.610
F: +420.255.729.611
E: sales@satcon.com

Satcon Shenzhen China
Room 1112, 11/F, International
Chamber of Commerce,
No. 168 FuHua San Road,
FuTian District, Shenzhen, P.R.C.
518048
P: +86.755.6168.2588
F: +86.755.6168.2599
E: sales@satcon.com

Satcon Shanghai China
Room 2308, 23/F, New
HongQiao Center Building,
No. 83 LouGuanShan Road,
Changning District,
Shanghai, P.R.C.
P: +86.139.1811.2818
E: sales@satcon.com

SATCON TEN (10) YEAR WARRANTY
FOR PHOTOVOLTAIC INVERTERS

1.0 DEFINITIONS

1.1. "Manual" means the current Satcon Installation, Operation and Maintenance Guide for the Product covered under this Warranty.

1.2. "Operator" means the owner or end-user of the Product for which Service will be performed under the Plan.

1.3. "The Product" means the Photovoltaic Inverter purchased from Satcon by Operator.

1.4. The "Registration Form" is the Photovoltaic Inverter Warranty Registration Form as set forth in Exhibit A of this Warranty. The Registration Form must be completed and returned to Satcon .

1.5. "Service Call" means a Site visit by Satcon technicians in response to a claim.

1.6. "Site" means the location of Operator's Product that is covered under this Warranty.

1.7. "Warranty Period" means the period of time the Product is covered under this Warranty.

1.8. "The Warranty" means this Warranty for Photovoltaic Inverters.

2.0 WARRANTY

2.1. Satcon warrants that any Product sold hereunder shall be free from defects in material and workmanship and shall substantially conform to the applicable specifications for the Warranty Period terminating one-hundred-twenty-six (126) months from the date of delivery or one-hundred-twenty (120) months from the date of first use for commercial purposes (but no later than 6 months from the date of delivery), whichever occurs first. The termination date of the warranty is set forth in Article 4 of Exhibit A ("Photovoltaic Inverter Warranty Registration Form") to this Warranty, which should be completed by Operator and returned to Satcon within 14 days of date of first use for commercial purposes.

2.2. In full satisfaction of any claim under this warranty, Satcon shall, if satisfied after its inspection, tests or other assessment that the Product is defective, either (i) repair any defective part or parts, or (ii) make available to purchaser or end-user ("Operator") such repaired or replacement part or parts or such service as is required to in Satcon's opinion correct the defect. Parts shall be delivered in accordance with the delivery terms applicable to the parts and services hereunder and any excess or replaced parts shall be returned FCA Seller's factory (INCOTERMS 2000). Service shall be performed during times mutually agreed upon in advance by Satcon and Operator. Satcon and Operator shall mutually agree upon the conduct of any tests required to determine whether a Product is defective in advance of conducting such tests.

3.0 THIS WARRANTY SHALL BE VOID IN THE EVENT OF THE FOLLOWING:

3.1. The Products have been damaged in shipment or improperly stored, installed or maintained or otherwise have not been used in conformance with the Satcon current Manual or have been altered or repaired without Satcon's prior written consent;

3.2. Operator fails to notify Satcon in writing within seventy-two (72) hours of any claim under this warranty; or

3.3. Operator fails to make any Product subject of a claim available for inspection and correction within seventy-two (72) hours of notice of the claim.

4.0 THIS WARRANTY DOES NOT COVER THE FOLLOWING:

4.1. Damage, malfunction, or degradation of electrical output caused, directly or indirectly, by any repair or replacement using a part or service not provided or authorized in writing by Satcon;

4.2. Damage, malfunction, or degradation of electrical output resulting, directly or indirectly, from Operator or third party abuse, accident, alteration, improper use, negligence or vandalism, or from earthquake beyond the Product's rating, fire, flood, direct lightning strike to the Product, other acts of God or severe weather beyond the Product's rating or by any other events outside of the control of Satcon;

4.3. Damage, malfunction, or degradation of electrical output resulting, directly or indirectly, from any third party components or monitoring systems that are either supplied by Operator or specified by Operator or purchased by Satcon on behalf of Operator, and incorporated into the Product;

4.4. Non-scheduled maintenance and repairs as a direct result of improper maintenance or the non-performance of maintenance, as set forth in the Satcon current Manual.

4.5. Internal and/or external damage as a result of non-Satcon involved shipping, installation that is not provided by Satcon, or any repair that is not covered during the Warranty Period.

4.6. Additional maintenance that may be required as a result of the Product being operated in severe, extreme or unusual conditions or otherwise not in accordance with the Satcon current Manual.

4.7. Additional maintenance that may be required as a result of any modification made to the Product that was not approved by Satcon.

4.8. Additional maintenance that may be required as a result of the following:

4.8.1. Accidental damage, abuse, misuse or consequential damage as a result of such an action, which is not caused by Satcon.

4.8.2. Failure to use the Product in accordance with the instructions contained in the Satcon current Manual.

4.8.3. Failure to ensure that the Product is properly, regularly and punctually serviced in accordance with the instructions and recommendations specified in the Satcon current Manual.

4.8.4. The Product being serviced by persons other than Satcon-authorized personnel.

4.8.5. Installation of non-Satcon approved parts.

4.8.6. Any repairs required as a result of continued operation of the Product once a defect has occurred (Including over-temperature situations or inadequate air flow)

5.0 THIS WARRANTY IS CONDITIONAL UPON THE FOLLOWING:

5.1. If applicable, the installation and operation, at Seller's sole discretion, of Seller's remote monitoring system to verify the performance of any Product sold under this Agreement;

5.2. Satisfactory inspection by Satcon's service representative, at Satcon's sole discretion, not more frequently than once a year;

5.3. Satisfactory rectification by Operator, at its sole expense, of any adverse or dangerous conditions or circumstances identified by monitoring or inspection;

5.4. Operator executing and delivering to Satcon, the Registration Form and, if applicable, the Satcon remote monitoring licensing agreements.

5.5. The customer is responsible for performing annual preventative maintenance per the Satcon current Manual:

6.0 SITE ACCESS FOR SERVICE CALLS:

6.1. Operator shall provide Satcon Service personnel with access to the Site and any special instructions for access to the Site. Satcon shall have no liability in the event that access is not provided to the Site and Operator will be invoiced for any costs incurred by Satcon in the event an additional visit is required to the Site due to lack of access.

6.2. It is the Operator's responsibility to notify Satcon of any hazards at the Site and assure that the Site is free from hazards or obstructions, and that all safety precautions are followed at the Site.

7.0 FORCE MAJEURE.

7.1. Neither Party shall be liable hereunder by reason of any failure or delay in the performance of its obligations hereunder on account of acts of God or other cause which is beyond the reasonable control of such Party and could not have been avoided by the exercise of reasonable prudence, including but not limited to natural disasters (e.g. earthquakes, floods, landslides), explosions, fire, destruction of machines, equipment, factories and of any kind of installation, prolonged break-down of transport, telecommunication or electric current or other circumstances with comparable effects (e.g. terroristic attacks, nuclear accidents, war, civil war or similar uprising, general strike, strike, lock-out). In the event of the occurrence of any force majeure event, the affected Party shall notify the other Party immediately in writing of the invocation of this Section, and each Party's obligations hereunder to the other shall be suspended for the duration of such force majeure event; provided, however, that the affected Party shall be obligated to use its commercially reasonable efforts to restore performance hereunder as soon as reasonably practicable, and provided, further, that if such event continues for more than thirty (30) days in the aggregate in any six (6) month period, the non-affected Party shall have the right to terminate this Agreement at any time upon written Notice to the other Party.

8.0 ASSIGNMENT

8.1. This warranty extends to the Operator, including any subsequent Operator or a lessee or assignee of a lease, at the same Site during the Warranty Period of the Product purchased by Operator, with the exception that the continuation of the warranty for an installed Product relocated to another site is subject to a site inspection by Satcon at the new Site prior to installation, at Operator's expense.

9.0 INSURANCE

Each Party shall maintain the following insurance coverage to insure risks at the Site:

9.1. Workers Compensation providing statutory limits and coverage and Employer's Liability, in an amount not less than Five Hundred Thousand Dollars (US$500,000) policy limits.

9.2. Commercial General Liability covering bodily injury (including death) and property damage in an amount not less than One Million Dollars (US$1,000,000) per occurrence. This includes premises Operations, Contractual Liability, Products and Completed Operations, and Broad Form Property Damage.

9.3. Commercial Automobile Liability in an amount not less than One Million Dollars (US$1,000,000) combined single limit per accident, covering all owned, non-owned, leased, rented or hired autos used in connection with the performance of this Plan.

10.0 LIMITS OF LIABILITY

10.1. THIS WARRANTY CONSTITUTES OPERATOR'S SOLE AND EXCLUSIVE REMEDY FOR CLAIMS AGAINST SATCON IN RESPECT TO DEFECTIVE OR NON-CONFORMING PRODUCTS HEREUNDER AND IS IN LIEU OF ALL OTHER WARRANTIES, CONDITIONS, GUARANTEES OR REPRESENTATIONS FROM SATCON RELATING TO THE PRODUCTS HEREUNDER, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, IN CONTRACT, TORT OR OTHERWISE, INCLUDING WITHOUT RESTRICTION, ANY WARRANTIES OF MERCHANTABILITY OR FOR FITNESS OF PURPOSE, AND ANY SUCH WARRANTY, CONDITION, GUARANTEE OR REPRESENTATION IS HEREBY EXCLUDED.

10.2. IN NO EVENT SHALL ANY CLAIM, FAILURE OF ANY PRODUCT HEREUNDER, OR BREACH OF THIS WARRANTY, RENDER SATCON, ITS AFFILIATES, SUBCONTRACTORS OR SUPPLIERS LIABLE TO OPERATOR OR ITS AFFILIATES FOR INDIRECT OR CONSEQUENTIAL DAMAGES OR LOSS OF USE ASSOCIATED WITH WARRANTY CLAIMS FOR LOST PROFITS OR LOSS OF REVENUES, OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, FACILITIES, SERVICES OR REPLACEMENT POWER, DOWNTIME COSTS, CLAIMS OF OPERATOR'S CUSTOMERS FOR SUCH DAMAGES, OR FOR ANY OTHER SPECIAL, CONSEQUENTIAL, INCIDENTAL, INDIRECT OR EXEMPLARY DAMAGES.

10.3. SATCON'S TOTAL LIABILITY FOR ANY AND ALL WARRANTY CLAIMS AND COSTS UNDER THIS WARRANTY SHALL NOT EXCEED THE TOTAL AMOUNT OF PAYMENTS RECEIVED BY SATCON FOR THE PRODUCT THAT IS THE SUBJECT OF A CLAIM.

EXHIBIT A

PHOTOVOLTAIC INVERTER WARRANTY REGISTRATION FORM

This completed Registration form must be returned to Satcon at the following address at time of first use for commercial purposes:

Satcon Technology Corporation
Service Department – Warranty Registration
2925 Bayview Drive
Fremont, CA 94538
Support@satcon.com

1. OPERATOR:

Operator Name:	
Operator Type:	☐ Integrator ☐ Site Owner ☐ Financier / PPA ☐ Other _____
Street Address:	
City, State, Zip Code:	
Contact Name:	
Contact Phone:	
Contact Email:	

2. PRODUCT SUBJECT TO THIS WARRANTY: (Enter Information From Inverter Nameplate)

Model #:	
Serial #:	

3. SITE OF THE PRODUCT:

Site Name:	
Street Address:	
City, State, Zip Code:	

4. WARRANTY TERMINATION DATE:

Date of First Use:	
Date of Delivery:	
Warranty Period:	10 Years
TO BE COMPLETED BY SATCON:	
Termination Date of Warranty:	

SATCON TECHNOLOGY CORPORATION **OPERATOR:**

By: _____ By: _____

Printed Name: _____ Printed Name: _____

Title: _____ Title: _____

Date: _____ Date: _____